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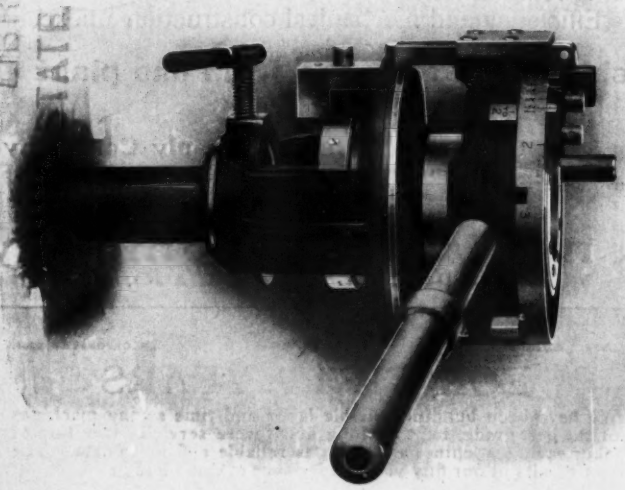

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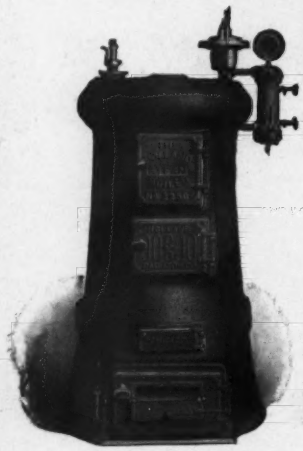

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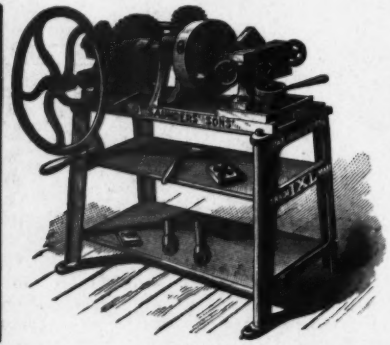

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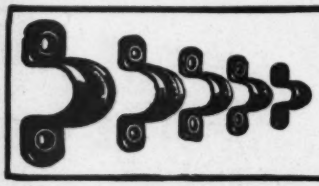

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Figure 4. Type of public urinal used in Prague in remote parts of the city and in parks. See article on pages 2-7 on "Public Toilet Conveniences in Prague, Bohemia, Austria."

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THE ADVERTISEMENTS IN DOMESTIC ENGINEERING ARE INDEXED. TURN TO PAGE XXX.

DOMESTIC ENGINEERING

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Copy and cuts for advertisements intended for a particular issue should reach the office of DOMESTIC ENGINEERING on Wednesday of the previous week if it is desired that a proof of the advertisement shall be submitted. New advertisements can be received up to noon of Wednesday of the week of issue, but no proof can be shown.

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The jobber of plumbing, heating and mill supplies, who knowingly places goods of secondary quality in competition with advertised branded goods of first grade, and represents them as being "just as good" is worse than in contempt of court, he is in contempt of the whole American people.

One of the most potent arguments for the establishment of public comfort stations in American cities is the fact that the population of our American towns is made up so largely of foreigners. These classes of our people are accustomed to public comfort stations in the cities across the sea from which they come. British and continental cities are very well supplied with public conveniences, and their citizens have come to look upon them as one of the necessities of municipal life. When they come to America and find no such conveniences for public use and are obliged to use alleys and out-of-the-way places, they naturally form a very wrong impression of our municipal pride. In order that we may understand what continental cities are doing in this direction we publish this week with great pleasure an article by Dr. Karel Gros, the Lord Mayor of Prague, the capital city of Bohemia, Austria-Hungary, which is profusely illustrated and shows that a very forward condition exists there with regard to this most important subject.

* * *

One of the interesting features of the operation of public comfort stations in the city of Prague is that some of them **are operated by private** persons under a contract with the municipality. The Lord Mayor in his article is unable to give the cost of these private stations or the receipts therefrom, as the concessionaires keep all of the statistics, but he says that it is an exceedingly profitable concession. In this country the construction of public comfort stations with private operation has been severely condemned, and while, perhaps, it may be said that such operation is better than no public comfort stations at all, it is a form of public utility which should not be allowed to drift into private hands.

* * *

One of the demands of the times is for a working knowledge of the disposition of sewage from small localities and public institutions. Public sentiment is now so well educated that further pollution of streams will not be permitted. This, in many cases, requires a disposition of sewage which will render the effluent entirely harmless. Because of this fact we are publishing this week an article by Prof. H. N. Ogden, special assistant engineer of the State Department of Health of New York, describing the sewage disposal plant at Ballston Spa, N. Y., a village of six thousand people. Complete treatment of sewage from small localities is comparatively recent. In New York state there are sixteen plants, of which the oldest at Brewster was constructed in 1893, but it does not represent modern ideas of treatment. The oldest plant which involves modern construction is that at Liberty, built in 1900, and it is interesting to note that the other fourteen stations have been built within the last eight years. There is also the system of partial treatment of sewage from establishments and small villages and cities, which is interesting and useful to know about, and appliances of this character will be described in future issues of "Domestic Engineering." Next week a non-technical article will be published, showing the character of various wastes which pollute streams.

Public Toilet Conveniences of Prague, Bohemia, Austria

By Dr. Karel Gros, Lord Mayor of Prague

[Editorial Note: The royal city of Prague, Bohemia, Austria, is, by reason of its unusual facilities for transportation by river, highways and railroads, the chief commercial city of Bohemia. Its population is slightly over two hundred thousand. At certain seasons in each year great fairs are held, which bring enormous crowds of transient visitors to the city. The wool fair lasts seven days, during which an enormous volume of business is done. Great religious festivals, like that of St. Wenceslas, the old patron saint of Bohemia, and that of St. Joseph Nepomuk, bring crowds of visitors and devotees to the city. Prague is a city dating from 722 and, while it contains many very ancient and historically interesting buildings, has also many beautiful modern buildings. The river Moldau traverses the city, from the banks of which the city's buildings rise in terraces till they are terminated and closed by hills of consierable height. The age of the city, its old and new buildings, its commercial prominence and its great but temporary gatherings of people make its sanitary problems interesting. Particularly shall we in America be interested by the arrangements provied for public toilet conveniences, and it is a distinct pleasure to be able—through the public-spirited interest of Hon. Joseph S. Brittain, Consul of the United States at Prague—to present this article by Dr. Karel Gros, the eminent Lord Mayor of the royal city, specially prepared for "Domestic Engineering," with the photographs which were taken especially to illustrate it.—Editor.]

THE privilege of erecting public closets for men and women in the city of Prague, Bohemia, Austria, was granted to private parties in the year 1888 by contract binding said parties for twenty-five years. Said contractor was obliged to construct the closets under the supervision of the Prague Building Department, at his own expense, for which he was granted permission to collect for the use of the closets of the first class eight hellers (one and six-tenths cents) and for the second class four hellers (four-fifths of a cent).

All managing expenses connected with the enterprise are defrayed by the contractor, who, on the other hand, is furnished gas and water by the city at special prices. The contract will expire in 1913, when it is probable the city will take over the business, which is quite profitable. Better and more modern improvements will then be installed. Inasmuch as those closets are in private hands it is impossible to furnish data concerning the cost of erection and maintenance. For the same reason it is impossible to give the number of patrons, as the contractor keeps the statistics.

The accompanying illustrations show the exterior appearance of the approved plan for two types of these privately managed conveniences. See Figs. 2 and 3.

Public urinals for men have all been built at the expense of the city of Prague. These are accessible free of charge. Every morning workmen in the employ of the city clean these conveniences, and see that they are in working order.

Aside from the public urinals there are several urinals in private houses, for the flushing of which the city furnishes the necessary water free of charge, thus making the use of these closets available to the public. To give the cost of the older types of

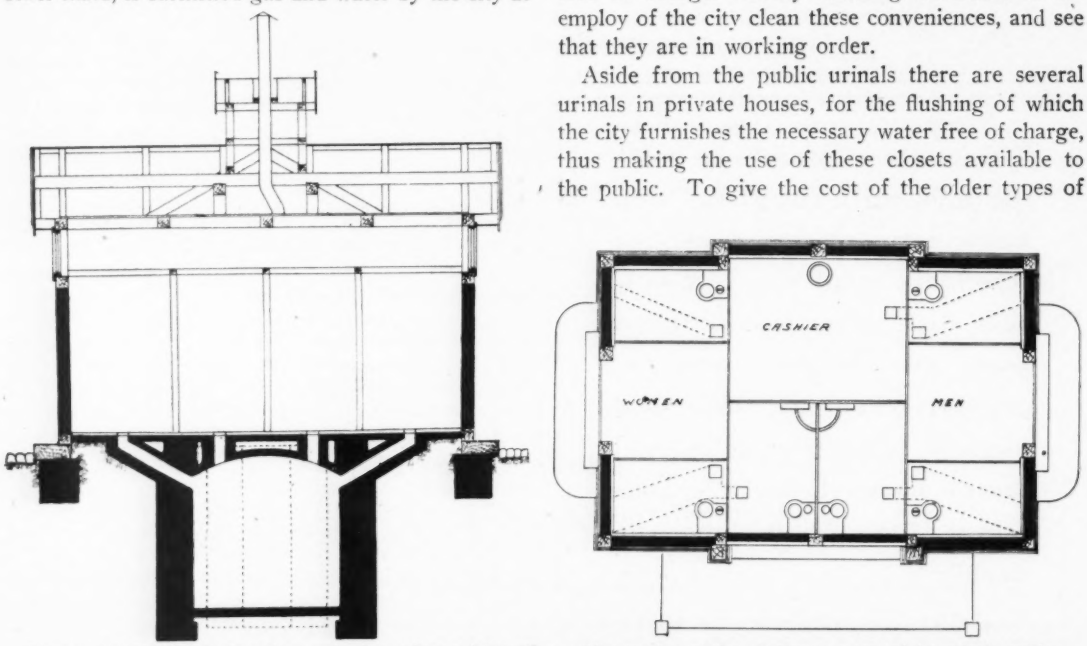

Figure 1. Sectional elevation and plan of one type of a public comfort station at Prague, operated by private parties under a contract with the city. Heating apparatus is shown in elevation and ducts for warm air in plan.

places of convenience would be difficult, as materials and labor have greatly advanced since their construction.

Regarding the places of convenience built by the city of Prague, it is worth while to mention the following particulars:

Some of the places of convenience are of the French boulevard kiosk type, containing rooms for only three urinals, and they are arranged for flushing by water. At night they attract attention by lighting the upper part, which is glazed, and which is also used as illuminated signs.

Urinals of small dimensions, in which but a small number of bowls can be placed, are not fit for frequented locations and are therefore used only in remote parts of city parks. (See illustration on page xxv.)

Urinals of the central system constructed of iron walls and scantlings are arranged for a large number of stands, which are either fitted closely to grooves all around the space inside the enclosure, or they are made in the shape of stalls radiating from a common center, the side of each stall being covered by an iron slab or slab of slate.

Both systems are arranged for flushing by water mechanically applied. The drainage in the second method is advantageous. These urinals have become very popular in Prague, and are found satisfactory; see Figs. 5 and 6.

Lately the urinals were changed in such a way that they could be used for the oil system.* The upper iron parts and the roof were retained, while

Figure 3. Exterior of a public comfort station in Prague, operated by private persons under a contract with the city. In addition to the receipts from users is the income from advertising.

* The "oil system" is much used abroad and will be fully described in a future issue.

the iron portion of the interior was removed and the lower part was built of bricks and lined with slabs of slate. Oil siphons of the "Beetz" system are used. The cost of this kind of urinals did not exceed 2,200 crowns ($446.60). See Fig. 7.

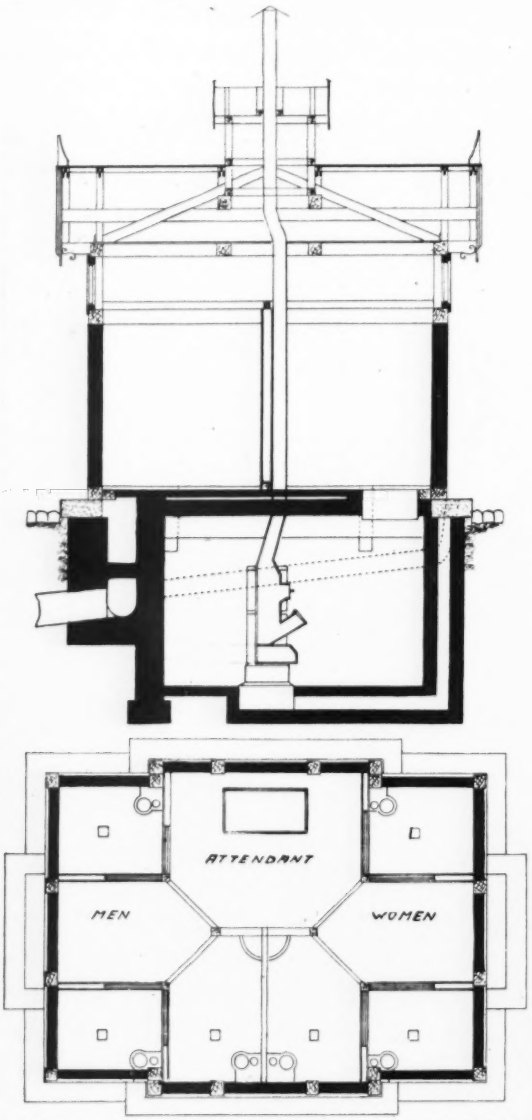

Figure 2. Sectional elevation and plan of a second type of a public comfort station at Prague, operated by private parties under a contract with the city. Heating apparatus with fresh air duct, and sewer connection are shown in the elevation, and openings for warmed air in the plan.

The latest modern type have been constructed at a cost of 10,000 crowns ($2,030). The frame of these urinals is iron, and the walls of Rabnitzl "Rabitz," lined with glazed tiles, and is arranged

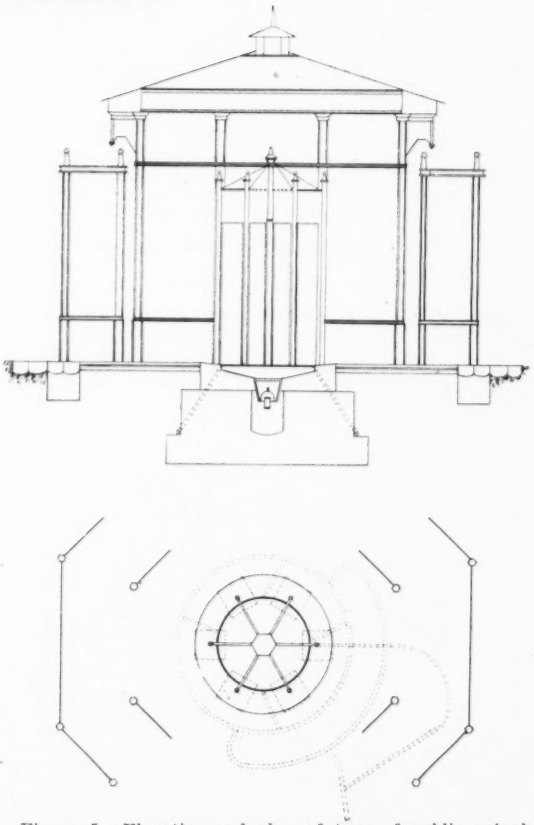

Figure 5. Elevation and plan of type of public urinal which is popular in Prague. Walls of the partitions are washed by water conveyed in flushing pipes, and the wastes fall into a common dump, supplied with a bell-trap, thence running to the sewer.

Figure 6. Exterior of a public comfort station much used in Prague. Elevation and plan are shown in Figure 5. There is every probability that these would become foul and unpleasant after short use.

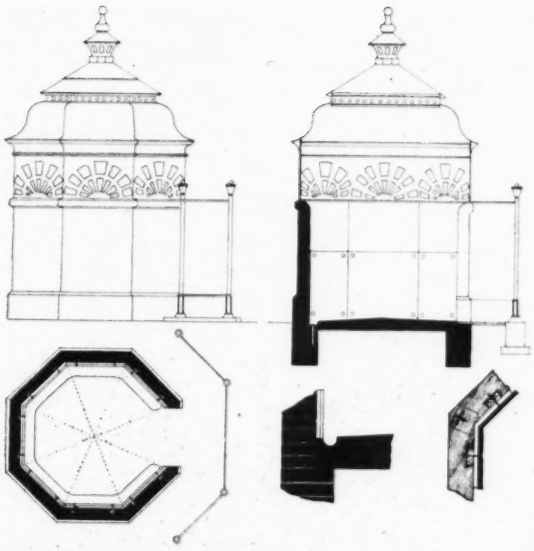

Figure 7. Type of public urinal as constructed in Prague, equipped with the Beetz oil system. See Figure 8 for exterior view.

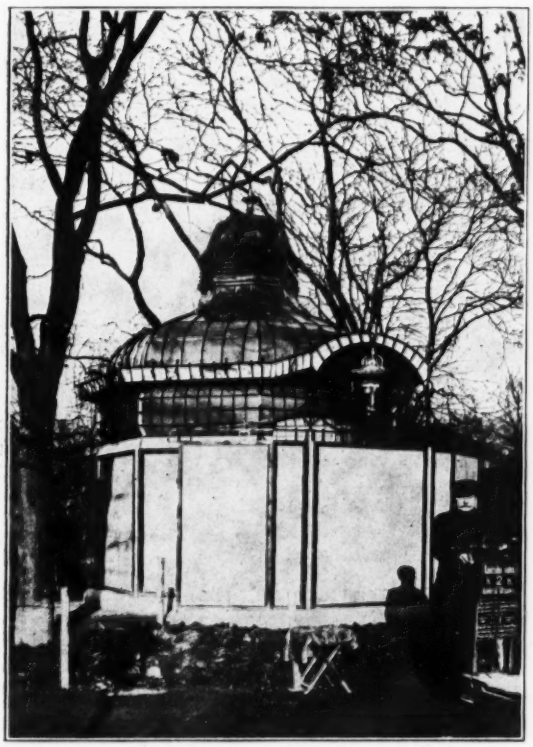

Figure 8. Exterior of public urinal as constructed in Prague, equipped with the Beetz oil system. See Figure 7 for elevation, plan and details.

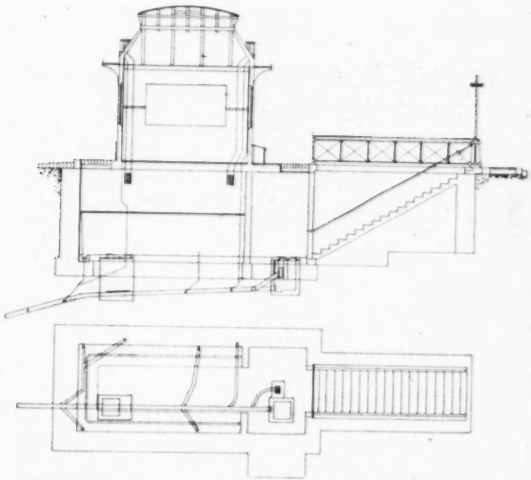

Figure 10. Sectional elevation and plan of an underground public comfort station in Prague. It is built in connection with a street railway station. The exterior is shown in Figure 11.

Figure 12. Entrance to underground public comfort station in Prague, built in connection with an electric street railway transfer station. For other details see Figures 10 and 11.

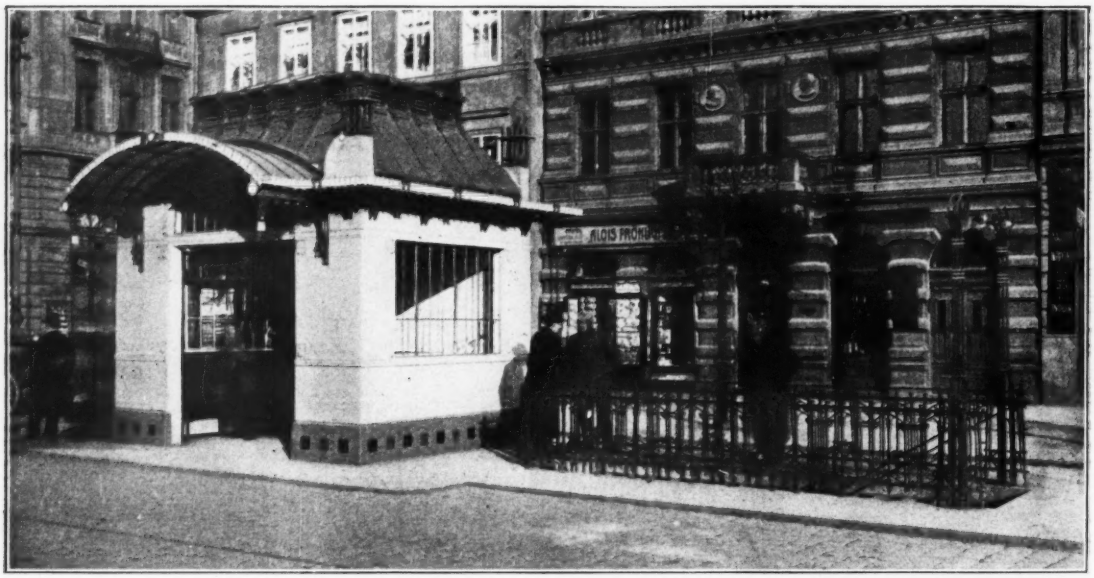

Figure 11. Exterior of an underground public comfort station in Prague, built in connection with an electric street railway transfer station. For sectional elevation and plan see Figure 10. For details of entrance see Figure 12.

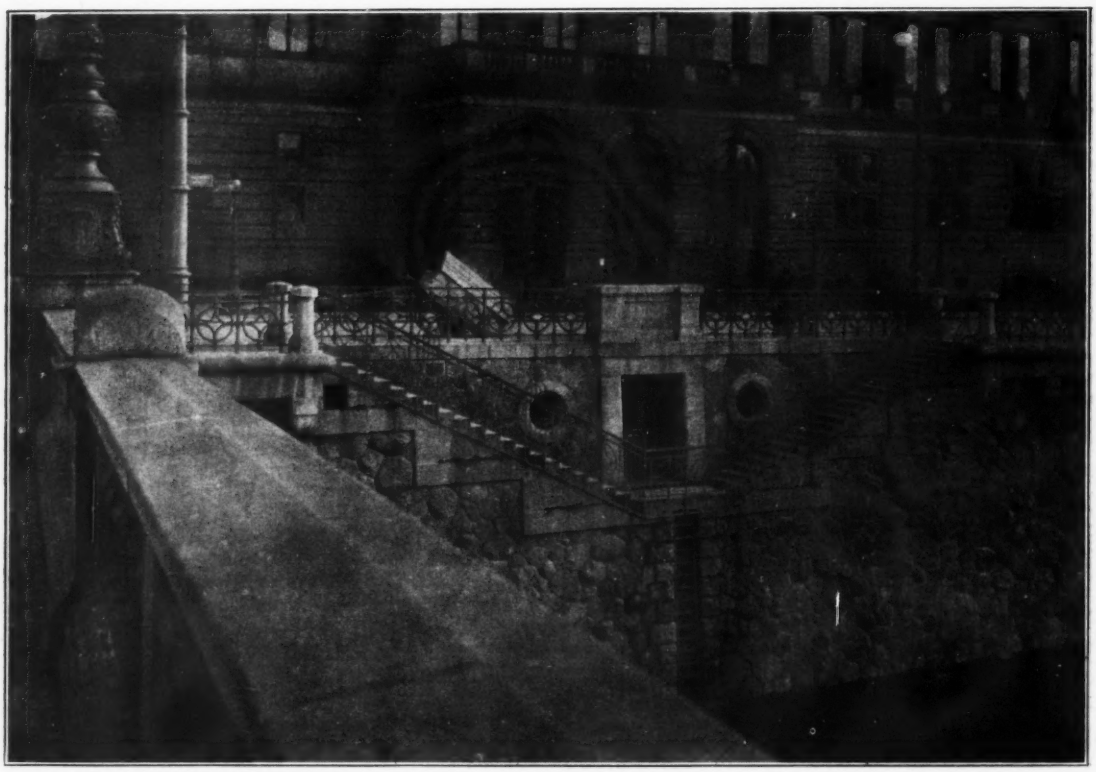

Figure 9. General view of approach to a most unique and interesting public comfort station in Prague. It is built in the wall along the river Moldau, is lighted and ventilated through the quay wall. Thus the street is kept free from obstruction.

exclusively for the oil system, which so far has given satisfaction, and has through its cleanliness and disinfecting qualities far excelled the systems arranged for flushing water, which, especially in winter time, do not work. Aside from this no material has shown sufficient resistance to withstand the deteriorating effects of the running water and freezing weather. Of course the oil system requires a more expensive outfit, namely, slate slabs for lining, which are covered with "Urinoir," a granite groove and "Beetz" oil siphons of zinc. See Fig. 8.

According to this modern oil system there have lately been built two underground urinals, which have been approved by competent persons, but from a sanitary point of view they are not superior to the first mentioned styles. In view of the great expense which their construction requires they are only proposed in places where they can be advantageously combined with other public structures.

The first urinal of this sort has been built in the wall along the river front, where it is ventilated through the windows of the quay wall. It is lighted through the windows and by skylight. See Fig. 9. The second one of this type has been built under the waiting room of the electric street railway station in the center of the city. The walls and the ceiling are lined with glazed tiles, which makes it easy to keep all parts of the urinal thoroughly washed. This is ventilated through the walls and roof of the waiting room. Details of these stations will be found in Figs. 10, 11 and 12. The cost of this station did not exceed 10,000 crowns ($2,030).

Arbitration.

He was a man of peace, and he came upon two youths in a back street fighting. Accordingly, he pushed through the crowd and persuaded the combatants to desist.

"Let me beg of you, my good fellows," earnestly besought the peacemaker, "to settle your dispute by arbitration. Each of you choose half a dozen friends to arbitrate."

"Hurrah!" yelled the crowd. "Do as the gentleman says, boys."

Having seen the twelve arbitrators selected to the satisfaction of both sides, the man of peace went his way rejoicing in the thought of having once again prevailed upon brute force to yield to peaceful argument.

Half an hour later he returned that way and was horrified to find the whole street fighting, while in the distance police whistles could be heard blowing and police rushing to the spot from all quarters.

"Good gracious, what is the matter now?" asked the peacemaker of an onlooker.

"Shure, sor," was the reply, "the arbitrators are at work."—Philadelphia Ledger.

Hot Water for Domestic Use—XVI*

EDITED BY JNO. K. ALLEN

Mem. Am. Soc. Inspectors of Plumbing and Sanitary Engineers; Mem. Royal Sanitary Institute of Great Britain; Assoc. Mem. Am. Soc. Heating and Ventilating Engineers; Hon. Mem. Chicago Architectural Club.

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Wherever gas water heaters are to be used for heating large tanks of water, that is to say, tanks of 100 gallons and over, the multiple type of heater must be used. A compact multiple gas water heater, in which three heaters are used, in connection with one large hot water tank, is shown in Fig. 18.

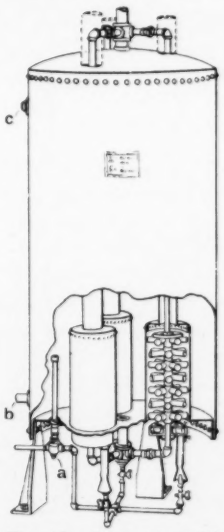

Fig. 18. Compact multiple gas water heater.

In this illustration, part of the lower part of the hot water tank is broken away to show the location of the heaters, and the manner of connecting them to the boiler. As may be seen, the heaters are set cloverleaf shape, and are snugly nested in cavities formed within the body of the boiler. From these cavities, vent pipes extend to above the top of the tank, so that the products of combustion can escape. If they could not, no hot water could be produced, for the gas would refuse to burn in the absence of air or oxygen. A good feature of the nesting of gas water heaters within the boiler, as is done in this case, lies in the fact that there is no loss of heat by radiation from the outer surface of the heater casings as there would be if these casings were exposed to the atmosphere. All heat of combustion, even to the exhaust heat in the gases passing up through the vent flues, can be transmitted to the water, so that enclosed heaters of this type develop the maximum efficiency, so far as utilizing all heat contained in the gas is concerned.

It will be noticed that multiple connections consisting of three-way fittings are used to connect the flow pipes from the bottom of the boiler to the bottoms of the heaters, and a like connection is used for connecting the return pipes to the top of the boil-

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*Previous installments in this series of articles were published March 7 and 21, April 4 and 18, May 2 and 16, July 11, August 15 and 29, October 3, 24 and 31, November 28, December 5 and 19. These back numbers can be obtained for 10 cents a copy.

er. From the top of the multiple connection on top of the boiler the hot water supply for the building is taken, and from the bottom outlet of the multiple connection at the bottom of the boiler an emptying pipe can be extended to some suitable place of disposal.

To prevent the waste of gas by keeping the heaters going after the water has been raised to the right temperature, a thermostatic arrangement similar to that shown at a may be used. This regulator, which automatically controls the supply of gas, is operated by the temperature of the water within the boiler, shutting off the gas when the temperature of the water reaches a pre-determined point, and turning the gas on again when by use or radiation the temperature of the water has again been lowered beyond that required. Locating the thermostatic tube in the lowest part of the boiler insures a good supply of hot water at all times, for, when the temperature of the water in the lower part of the boiler is cool enough to open the gas cock and thus turn on gas to the heater, to heat the water, there will be a sufficient supply of hot water in the top of the boiler to supply the various fixtures until the heaters catch up with the demand for hot water. The burners used with multiple heaters are of the Bunsen type, and when a thermostat is used, they must be provided with pilot lights or other means for automatically igniting the gas when it is turned on by the thermostat. If there were no means for automatically lighting the gas, and the flues were connected to chimneys leading to the outer air, gas could escape continuously and no evidence of the fact would be noticeable within the building, and no good would be accomplished by the gas.

Side outlets, b and c, are provided in the hot water tank, so that if desired a water back, special coal burning heater or garbage burning water heater can also be connected to the tank.

AUTOMATIC INSTANTANEOUS WATER HEATERS.

In the gas water heaters just considered the heater does the work of a water back, and a hot water tank is required to store the hot water in. With automatic instantaneous water heaters, on the other hand, no boiler or reservoir is necessary, the heater supplying the hot water as it is wanted and direct to the faucets without the intervention of storage devices of any kind. There are many features about this type of heater which makes it particularly desirable for heating water under many conditions. The heater can be located in the basement or cellar, where the living rooms will not be heated by the radiant heat escaping from the heater casing. Gas is not consumed keeping hot a large volume of water which is constantly giving off heat to the atmosphere, and fuel is being consumed only when hot water is being drawn from a faucet. Having the heater located in the basement or cellar, or in some other compartment away from the living rooms is very desirable in warm climates, whereas in cold parts of the country the additional heat might prove very acceptable in the kitchen. When such is the case an automatic instantaneous water heater may be located in the kitchen, or a gas water heater with storage tank used, both to heat water and keep the kitchen warm.

The greatest use for the automatic instantaneous heaters is found in modern residences, where the effort is made to provide both comfort and convenience in the kitchen. In these buildings gas ranges are substituted for coal ranges, so the kitchen will be cool in the summer time, and radiators or registers, as the case may be, are provided to heat the kitchen in the winter.

To be continued. All rights of republication reserved.

Hot Water Heating for Apartment Houses and Office Buildings—II*

By Chas. L. Hubbard

There are two systems of hot-water heating in common use. In one case the circulation is by gravity and is due to the difference in pressure in the supply and return risers supplying the radiators.

This is the simplest method and the one commonly used in buildings of medium size. The flow of water through the pipes is slow and they must of course be made correspondingly large.

In buildings of large size, where there are long horizontal runs of piping, and also in tall buildings, where there are a large number of radiators supplied from a single riser, "forced circulation" is employed.

In this case a pump, usually of the centrifugal or rotary type, is used for driving the water through the mains and branches. Under these conditions a much higher velocity of flow is obtained and the pipes may be made much smaller. The pumps may be driven by a steam engine, turbine, or electric motor, as most convenient.

Hot-Water Heaters.—Hot-water heaters, commonly called boilers, are practically the same as

* The first installment in this series of articles was published in the issue of December 26.

those used for steam, and in fact some makes are used interchangeably by omitting the water-glass and gauges in case of a steam boiler, and substituting a water relief valve in place of the low-pressure safety-valve. The principal distinction between the two is the omission of the steam space from the water boiler, and it is not necessary for the water passages to extend so directly from top to bottom, as in the case of a steam boiler, since the problem of providing for the free liberation of steam bubbles does not have to be considered. In computing the size of a boiler the same methods may be followed as in the case of steam, it making no difference whether steam or hot water is the medium for carrying the heat from the furnace to the rooms.

It is sometimes stated that owing to the greater difference in temperature between the furnace gases and the water in a hot-water boiler, as compared with steam, that the heating surface will be more efficient and that a smaller heater can be used.

While this is true to a certain extent theoretically, any practical advantage gained in this way is too small to be considered in the actual design of a heating system.

There are various forms of boilers in common use. The round sectional boiler is the most common type used in buildings of small size. It is simple in construction, and has a circular grate surrounded by a water-leg. The gases in passing to the smoke pipe flow through numerous passages surrounded by water, and so give up a good proportion of their heat before reaching the chimney.

Another common form is made up of vertical sections connected with headers at the sides and top.

Another form of heater is the one without outside headers or drums.

In buildings of very large size ordinary wrought iron fire-tube boilers are commonly used. Under these conditions the entire shell is filled with tubes, as no steam space is required, and baffle plates provided to cause the water to circulate through all parts of the boiler when used in connection with forced circulation.

Temperature Regulation. The temperature of the water in the boiler may be regulated automatically when desired by a special device, of which there are several upon the market. They are constructed in different ways; some depend upon the expansion of a metal pipe or rod at different temperatures, and others upon the vaporization and resulting pressure of certain volatile liquids. These means are usually employed to open small valves, which admit water pressure under rubber diaphragms, and these in turn are connected by means of chains with the draft doors of the furnace, and so regulate the draft as required to maintain an even temperature of the water in the boiler. One of the first type attached to the flow pipe of a boiler is shown in Fig. 1. "A" is a metal rod, and is so connected with the valve "B" that when the water reaches a certain temperature the expansion of the rod opens the valve and admits water from the street pressure through the pipes "C" and "D" into the chamber "E." The bottom of "E" consists of a rubber diaphragm, which is forced down by the water pressure, and carries with it the lever which operates the dampers, as shown, and checks the fire. When the temperature of the water drops, the rod contracts, and valve "B" closes, shutting off the pressure from the chamber "E." A spring is provided to throw the lever back to its original position, and the water above the diaphragm is forced out through the pet cock "A," which is kept slightly open all of the time. In the case of small boilers, automatic regulation is often omitted, as one soon learns the proper position of the dampers to maintain a fairly even temperature under different conditions of outside temperature. Sometimes one is used and set to close the dampers when the temperature approaches the boiling point.

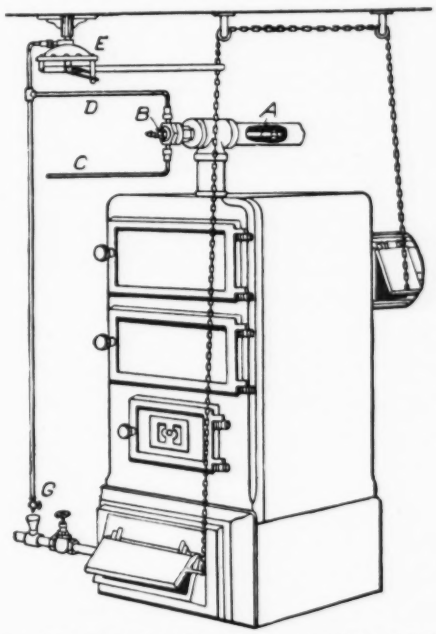

Fig. 1. **Showing type of temperature regulator depending on the expansion of a metal rod at different temperatures.**

In this respect it corresponds to the safety valve on a steam boiler.

Cause of Circulation.—In a gravity system of hot water heating the circulation through the radiators is produced solely by the difference in weight of the water in the supply and return pipes, due to the difference in temperature, as has already been stated. Heating water causes it to expand and become lighter, hence the cooler water in the return pipes tends to fall and force that in the supply pipes upward

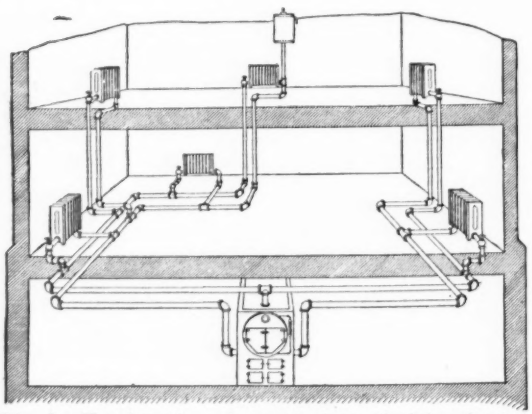

Fig. 2. Showing plan of common type of piping for hot water heating system.

and through the radiators. This action is increased as both the difference in temperature and the elevation above the boiler increase.

Radiators.—The radiators used for hot water heating are similar to those for steam, except the sections are connected at the top as well as at the bottom. This passage is both for increasing the circulation of water within the radiator and for drawing off the air which rises to the top of each loop and which would stop the circulation if not removed. Wall radiators are adapted to hot water, as well as steam, provided the connections are properly made.

The radiators for indirect hot water heating are of the same general form as those used in steam heating, the important condition being that the water shall have a continuous downward passage through the section, from the inlet at the top to the outlet at the bottom. The drum pin radiator is a good form for hot water heating, where there is sufficient head room. Another type without the pins is made up in stacks by means of short nipples.

Efficiency of Direct Radiators.—The efficiency of a hot water radiator depends entirely upon the temperature of the water within it. It is common practice to count on heating the water to about 180° in zero weather and to return it to the boiler at about 160°, which gives an average temperature to the radiators of 170°. An average cast iron radiator gives off about 1.7 heat units per hour per degree difference in temperature between the air and radiator, which in this case is 170—70=100°, making the efficiency of the radiator 100×1.7=170, which may be used under ordinary conditions. When the radiator is of a deep or very close pattern the efficiency should not be taken as more than 150 or 160 at the most.

Systems of Piping.—There are several systems of piping for hot water work, the most common being that shown in Fig. 2, which is similar to the ordinary "two-pipe" system used for steam. In this arrangement the supply main and branches have an upward inclination from the boiler, and the returns are given a slight downward pitch in the opposite direction. The flow pipes or risers are taken from the tops of the mains and may supply one or more radiators each, as in the case of steam. In any system of piping care must be taken to secure an equal resistance, so far as possible, in all directions, so that each radiator may receive its share of water. It will always be found that the principal current of heated water will take the path of least resistance, and that a small obstruction or inequality in the piping is sufficient to interfere greatly with the amount of heat received in the different parts of the same system.

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Fuel Economy*

BY L. J. WING, OF NEW YORK CITY.

On account of the steadily increasing cost of all kinds of fuel I deem the question of fuel economy as the most important subject before this association, composed of heating and ventilating engineers and contractors for heating and power plants.

The reports and papers that have been read on "saving of heat units by the use of the various types of radiators and various systems of piping, etc.," have been very interesting, and undoubtedly of assistance to the members of the association.

I ask the question, Which is the most important, the saving of the small difference of heat units delivered by the different types of radiators or systems of piping, etc., or the producing of the greatest number of heat units from the fuel burned?

It is a well known fact that well equipped and properly run boiler plants will give from 25 to 50 per cent more steam per pound of coal than the commonly equipped and carelessly run plant will.

I think it is the duty of heating, ventilating and

*Read at the last annual convention of the American Society of Heating and Ventilating Engineers.

consulting engineers to use their knowledge and influence to teach acting engineers and firemen the art of saving fuel, and also persuade owners to properly equip their boiler plants and insist upon their employes giving the best possible care and attention to operating the plant to get the greatest efficiency and economy possible.

On account of the enormous consumption of coal, oil and other fuels in this and other countries, it is only a question of time when power derived from steam will be very costly; therefore, any improvement in combustion is of benefit to mankind, as well as to owners of large or small power plants.

J. C. Jurgensen, a well known practical and consulting engineer, writes on this subject as follows:

"Fuel economy is today a question of paramount importance, and it will pay every ambitious operating engineer and fireman well to study it closely. As a general rule the boiler plant and the men who actually operate it are the most neglected factors in the plant; this is the more curious as the boiler plant and its operators really determine one of the largest fixed charges against any product turned out from a factory or other steam-using business. Thousands of boilers can be pointed out where, if the conditions were carefully studied and proper arrangements for economy were made, from 5 to 25 per cent of fuel could be saved, while at the same time an increase in boiler capacity of from 10 to 50 per cent could be gained. Daily study of the varying conditions in the boiler plant; their intelligent understanding and willingness to employ the knowledge thus gained ought to mean a substantial increase for any engineer or fireman who takes the trouble to apply himself to the study of fuel economy.

"The boilers are that part of a plant where the most money can be saved or squandered. There are every day opportunities present in the fire room, which, when grasped by the intelligent engineer or fireman, soon will single him out as a man who will be considered."

Now what is the best way to operate a boiler plant to deliver the greatest amount of actual power from a pound of any given kind or quality of coal?

I trust that our members who have had experience in this line will give us practical information on this subject.

From my experience in this matter I think the questions of grates and draft are the two most important points.

The grates should be made so as to give sufficient air space and yet not allow loss or waste of coal by falling through the opening of the grate. This is particularly necessary when burning small anthracite.

I have seen cases where the loss from this cause was from 10 to 15 per cent.

The amount and temperature of the air supply is in my opinion the leading feature in fuel economy.

I find that a large number of architects and consulting engineers still hold that a tall chimney or an induced draft is the best and most economical system.

I do not agree with them. A strong draft by a tall chimney necessarily requires a great amount of heat in the stack to make the draft. The heat going out of the stack is an absolute waste.

On tests made in a large plant here in this city having a system of forced draft with a stack nearly

This Paper tells what real Fuel Economy is

300 feet high showed the gases 64 degrees lower when the blowers were in use than with the natural draft, while the saving in fuel was over 18 per cent, and the boilers gave 30 per cent additional power; at the same time the grates and tubes were kept in better condition than with natural draft.

With a strong natural or induced draft making a vacuum in fire and combustion chambers, the tendency of the air or gases is to take the most direct route from inlet to outlet, leaving a large portion of the shell or tubes out of the current, and, therefore, all parts are not heated equally, which is not good for any type of boiler.

Another objection is the fact that when the fire door is opened to feed or clean the fires a large amount of cold air is drawn in, which strikes the parts of the boiler subjected to the most intense heat, causing great unequal contraction and expansion, which causes great injury to the shell and tubes and greatly reducing the furnace temperature and causes the steam pressure to drop.

On this point I again quote Mr. Jurgensen:

"A very important and partly avoidable loss is due to excess of air supply and too high a temperature of escaping gases; the cause of this loss needs to be looked into carefully in order to prevent the conditions to obtain leading to this loss, which is often considerable.

"There is a good deal of uncertainty as to the excess of air needed; it is generally agreed that with

ordinary chimney draft 100 per cent additional is needed, or 23.2 pounds, and with mechanical draft giving moderate pressure in the ash pit 30 per cent, or 17.4 pounds. For various reasons, with mechanical draft the excess may with profit be further reduced; the actual excess for a given fuel under the many different conditions possible can only be found by intelligent experiment. As before stated, with chimney draft the air supplied is seldom less than 100 per cent more than the actual amount needed. Conditions leading to air excess need be studied closely, and to avoid loss on this account as much as possible regulate the air admission and the hand dampers carefully and watch the results of such regulation in the color of the fire.

"The hand damper on a boiler is not appreciated as it should be in the hands of an intelligent engineer and fireman. It may be regarded as a regulator enabling them to steer the boilers under their care to a satisfactory berth in the port of good economy.

"The weight of the chimney gases discharged per pound of carbon burned when 100 per cent. excess of air is used is $11.6 \times 2 = 23.2$ lbs.; adding the weight of the carbon it is 34.2 lbs. To heat this enormous weight of gas discharged by the chimney to a much higher temperature than necessary means a loss in money value that would stagger most plant owners if it was thoroughly appreciated."

Practical tests on many boilers have shown that with a blower and a small per cent of good dry steam thoroughly mixed with the air under the ash-pit, with a steady even pressure, keeps the grates in good order, gives more perfect combustion, leaving less ashes and clinkers than with the hand dampers closed to that point that, when the fire door is opened, there is only a slight inward draft, but no gases coming out. This will give a clear white flame, and being a plenum or slight pressure in the fire and combustion chambers the shell or tubes will be evenly heated, the whole length giving more steam and yet keep the boiler in much better condition, while the saving in cost of fuel is from 10 per cent to 50 per cent.

I also find it a good plan to carry a pipe or duct from the blower to the top of the boiler, and draw the hot air down and burn it, as it saves fuel and cools the boiler room.

Sure.

Mother (indignantly)—You naughty boy! Stop pulling that poor cat's tail.

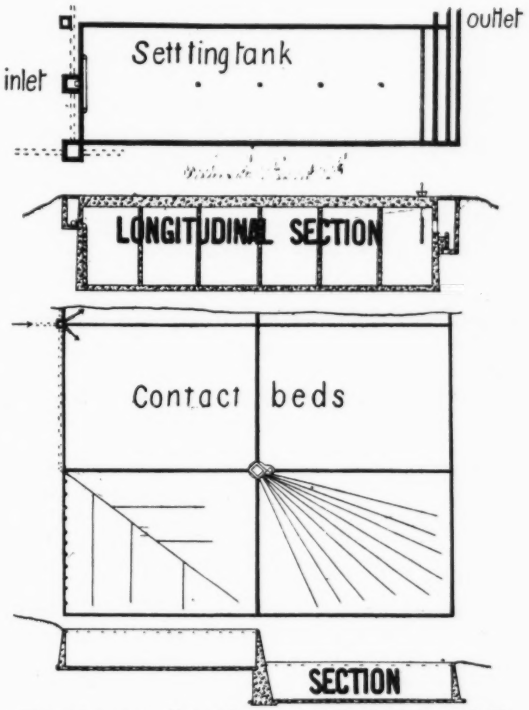
Little Innocent—I'm not pulling it. I'm only holding on. The cat is doing the pulling herself.

Sewage Disposal System for a Village

PROF. H. N. OGDEN

Ballston Spa is a village of about 6,000 people situated on the Kayaderosseras creek about four miles from Saratoga lake. The domestic sewage for purposes of the design was estimated at 500,000 gallons, in addition to which 400,000 gallons of tannery wastes entered the sewers, possible filtration bringing the total estimated daily flow of sewage up to 1,000,000 gallons per day. The plant is of particular interest from the fact that nearly one-half of the daily flow of factory waste is of a kind usually considered difficult to handle. The sewage is delivered from the village to a receiving tank on the outskirts, the capacity of the tank being one-quarter of the day's flow. It is 70 feet in diameter, 9 feet deep and divided into two equal compartments by a concrete wall extending from floor to roof. In this way either one or both compartments may be used at will. The suction pump is built on the side of a circular well and is 12 by 24 feet and 8 feet deep. A single-action plunger pump forces the sewage from this well to the settling tanks, which are 2,700 feet away and on the top of a hill about ten feet higher. The settling tanks are three in number, so arranged that they may be operated singly, in sets of two, or all at the same time. Each tank is 111 feet long, 35 feet wide and averages 7½ feet deep, containing 218,000 gallons. The pump well, holding sewage about three hours, delivers the sewage to these tanks already partially septicized, and with only one of the tanks in action an eight-hour period is obtained, and with the three tanks in operation a detention period of not far from twenty-four hours can be counted on. The force main enters a concrete manhole at the tanks and from there is led by a twelve-inch pipe into the tanks, two openings being provided for each tank. No baffle walks are provided at the inlet end, but a movable baffle wall operated by screws is provided about four feet from the outlet end. Each tank is provided with a twelve-inch sludge valve and

sludge pipe connection, opening out onto sludge tanks behind the tank. The outlet weir is of stone, eighteen inches wide and two inches thick, built into the end concrete wall with a slope of one inch outward. Just behind this outlet weir and following the outlet channel, which is two feet wide and two feet deep, is a deposit of coke breeze filter. This coke bed is intended to arrest the progress of particles in suspension which pass out from the settling tanks, and to that extent protect the contact beds from clogging. It is also



Plan of sewage disposal system at Ballston Spa, N. Y.

stated that this coke bed will act as an aerator and start the exudation of the effluent.

From the settling tanks the sewage passes to the contact beds, of which there are four primary and four secondary. The effluent from the tanks flows directly to the gate chamber of the contact beds through a twelve-inch vitrified pipe sewer. The gate chamber is four feet square and has four bronze mounted valve gates which control the flow of sewage to the four primary contact beds. These beds are each 120 feet wide and 6 feet deep. The contact material is broken field stone of a hard and crystalline character like granite and very uniform. The depth of this material is five and one-half feet. The under-drainage of the beds is secured by a series of nine lines of five-inch horseshoe tile underdrains laid on the concrete floor and radiating towards the center, at which is the gatehouse. The gates of the valves, which control the emptying of the primary beds as well as the emptying and filling of the secondary beds, operate by hand. There is a float gauge with an indicator in the gatehouse which shows the level of the sewage in the bed. A twelve-inch gate valve opens and shuts to control the flow from the beds. It is estimated that each bed will hold 130,000 gallons of sewage independent of the contact material.

A New Plumbing Ordinance for Oakland, California

The following rules and regulations for the plumbing and drainage of buildings in the city of Oakland, Cal., were recently endorsed by the Board of Health in that city, and they are now before the City Council, which in all probability will pass them in their entirety in the near future:

The people of the City of Oakland do ordain as follows:

Section 1. The following rules and regulations respecting the plumbing and drainage of buildings in the City of Oakland are hereby adopted, and all work in respect thereto shall be performed as herein required, and not otherwise.

Quality of Material and Workmanship.

Section 2. All material must be of good quality and free from defects. The work must be done in a thorough and workmanlike manner.

The weight and size must be cast on the pipe.

Diameter.	Wt. per lineal ft.	Diameter.	Weight.
2 inches	5½ lbs.	7 inches	27 lbs.
3 inches	9½ lbs.	8 inches	33½ lbs.
4 inches	13 lbs.	10 inches	45 lbs.
5 inches	17 lbs.	12 inches	54 lbs.
6 inches	20 lbs.		

Arrangement of Pipes.

Section 3. The arrangement of sewer, drain, soil, waste and vent pipes must be as direct as possible.

Excepting as provided for in these rules, all changes in the direction of sewer, drain, soil and waste pipes shall be made with Y branches, 1-6 or 1-8 bends.

Offsets may be used, provided the angle they present is not more acute than that presented by a 1-6 bend.

Where, under these rules, cast iron vent pipe is allowed, then double hubs are allowed, but on the vent pipe only.

Neither brass, wrought nor cast iron sleeves are allowed in any case.

Straight crosses, bands and saddles are prohibited.

Four by two, or any other heel, outlet fitting, will not be allowed to act as a waste pipe through the 2-inch opening, excepting on vertical lines.

Excepting where under architectural conditions the space is limited, double T Y's will not be allowed to serve closets, and then only on vertical lines or stacks.

Where by architectural conditions it is not practicable to use Y's or to comply strictly with the rules as to the manner of venting, then these rules must be complied with as nearly as practicable, and the exceptions meet the approval of the health office.

Separate Sewers.

Section 4. Excepting as provided for in these rules, every house and building must be separately and independently connected with the street sewer.

Where there is a house in the rear of a lot and there is to be an additional house built in the front of the lot, then the same sewer may serve both buildings. This shall apply also to where conditions are reversed and the front building is built first, or when both are built, provided that in all cases these rules are complied with. In exceptional cases, where two or more buildings are erected on a corner lot and on a cross street, all owned by one party, and the side street having a steep grade, and the sewer in cross street being higher than the rear of the buildings, then, in the judgment and with the consent of the Board of Health, one sewer main may drain several separate buildings, when run in the rear of said buildings, and thence to main sewer in side street, but only in such cases.

Where there is an old sewer serving a building, either front or rear, provided the sewer will satisfactorily stand the "water test," it may serve either front or rear premises, excepting that portion of the old sewer, as is within the foundations or area of the new or additional structure must comply with these rules as to quality and kind of material used and boundaries and intermediate section rules.

A "house or building" shall be defined as being an architectural structure, covered by one roof and enclosing walls.

Porches, or the continuation of porch roofs, from building to building, shall be considered as being a portion of the main structure.

Buildings situated upon the same lot, which said lot has frontages upon different streets or alleys or courts, the buildings having abutting or connecting porches, shall not be construed as forming one main structure.

Sewer or Drain.

Section 5. Excepting as provided for in these rules for the use of wrought iron pipe, the sewer, when it lies under the building, and for three feet beyond the front wall, or of any area wall, or any wall of adjoining premises, shall be of extra heavy cast iron pipe, and all fittings to same shall be of the same material.

Outside of the building line the sewer shall be continued to the main sewer in street with either cast iron or vitrified iron stone pipe of the best quality.

The use of intermediate sections of iron stone pipe between cast iron pipe, or the introduction of cast iron sections between iron stone, or the introduction of standard pipe between extra heavy, or the introduction of standard pipe between extra heavy or iron stone shall not be allowed.

When iron stone pipe is used for sewer pipe in an area or alleyway, then the line of the sewer must be situated not less than three feet from the foundation or area walls of any building. Where said areaway is less than six feet in width the sewer must be of cast iron or wrought iron pipe.

In plating works, chemical works, acid works and manufactories where chemicals are used, the waste of same shall discharge into the main sewer in the street through a separate vitrified iron stone pipe, which shall be laid in a manner conforming to all the requirements of this ordinance.

All sewer, drain, soil, waste and leader pipe (excepting as is provided for in the case of outside leaders) lying within the area of either a ground story, basement or merely a foundation space, or in case of there being a foundation space and a basement, or of a foundation space and a ground story, or of a sub-cellar and a ground story, then in either and all these cases, must be constructed of cast iron, where it lies under the building and at least three feet beyond the exterior wall of the building. When the space between the floor joists and the surface of the ground is less than two feet, said drain shall be constructed of extra heavy cast iron pipe. But when the house drain is outside the building lines, it may be of iron stone pipe. All cast iron pipes and fittings underground must be extra heavy, or as provided for, wrought iron may be substituted in lieu of cast iron. All lines shall be continued to the end of their various runs of the quality of material herein required, to a point beyond the extra heavy boundaries herein laid down, and as required by these rules.

The term "soil pipe" is that applied to any pipe receiving the discharge from one or more water closets, with or without other fixtures. The term soil pipe does not apply to any pipe situated above the boundaries defined in preceding paragraph, when in confliction therewith.

Waste pipe is the term applied to any pipe receiving the discharge of any fixture except water closets, but this term shall not be construed to conflict with the requirements of this section.

The waste pipe, either vertical or horizontal, receiving the discharge of 16 or more fixtures, shall not be less than three inches in diameter.

When, under preceding paragraph, it is required that the diameter of waste be increased, then the entire line must be carried to above roof of the full bore of the increased size.

Where the entire waste of any fixture discharging into an open hopper or scullery sink exceeds five feet in length, then the said fixture must be properly vented.

All surface drains, soil and waste pipes discharging below the sewer line of any building, and all such receiving drainage or wastage must be connected in a sanitary manner satisfactory to the Board of Health.

and receive the approval of said department prior to use.

Iron Stone Sewer and Drain.

Section 6. All joints on iron stone pipe must be made with Portland cement and each joint of pipe when laid must be properly cleaned out with a suitable scraper before the succeeding joint is put in place.

Iron stone pipe must be of a size one inch larger in diameter than the pipe they serve.

Joint on Cast Iron Pipes.

Section 7. All joints on cast iron pipe and fittings to same must be made with suitable packing of oakum, properly caulked, and run full with molten lead, properly caulked.

Sewers to Have a Fall.

Section 8. All sewers, drains, soil, waste pipes and leaders shall have a continuous fall of not less than one-quarter of an inch to the foot, and, if practicable, more.

Where practicable iron sewers, drains, soil and waste pipes running in cellar or lowest story of a building shall run along the wall of the building, or, if this is not practical, be hung with iron hangers, securely fastened to the floor joists.

When it is not practicable to run and fasten the iron sewer, drain, soil and waste pipes as above directed, then they may be run in a trench cut to a uniform grade.

Traps in Sewer.

Section 9. The sewer or drain shall have a trap placed either at the line or curb of a sidewalk or immediately inside the area wall under sidewalk.

Fresh Air Inlet.

Section 10. Every house drain or sewer shall have a fresh air inlet of not less than 4-inch pipe, and said inlet shall present not less than 16 square inches of perforation. Said air inlet shall be connected to the house side of the trap and lead to the outer air, terminating at a point not less than 10 feet from any door or window.

The main trap at sidewalk shall have its fresh air inlet so constructed as to freely admit a supply of the outer air and at the same time offer adequate protection against the introduction of foreign matter into the trap, all to the approval of the Health Board.

When fixtures are located under sidewalks they may either be vented into the fresh air inlet of the main trap or they may be vented to an independent vent running to the roof. It is provided, however, that in all respects fixtures thus vented must comply to these rules and regulations as nearly as possible.

When fixtures are vented as provided for in preceding paragraph then the avoidance of the collection of and the carrying off of sediment must be strictly complied with.

Clean-Outs.

Section 11. Heavy brass, male threaded "clean-outs" of at least one-eighth of an inch in thickness in the ferrule part and with three-sixteenths of an inch thickness in cover, the cover to have a solid cast iron square head of 1½ inches square and one inch in height, shall be placed at the end of each horizontal of sewer or drain and its contributory laterals.

Clean-outs, the ferrule or body part of which are made of cast iron, provided they comply with all other requirements as to brass cover, etc., may be used in lieu of all brass, and in wrought iron work solid clean-out plugs may be used.

All clean-outs shall be of the same size as the pipe they serve and must be placed so as to be accessible.

Material of Pipes.

Section 12. Excepting as provided for in these rules, every sewer, drain soil, waste and leader pipe must be of either cast iron, lead or of wrought iron pipe and the fittings to same must be of the same material excepting as hereinafter provided.

Securing Pipes and Size of Soil.

Section 13. No soil pipe of an inside diameter less than four inches shall be permitted.

All iron sewers or drains not trenched and all soil, waste and leader pipes shall be properly fastened and secured with either heavy bands, wrought iron straps or hooks. If hooks are used, they shall be forged out of one piece of iron and not welded.

All outside horizontal and vertical lines of soil, waste and leader pipes shall be secured with heavy band wrought iron straps, with four wood screws to be with each strap, and the straps placed at intervals not exceeding five feet. Inside these lines shall be secured to the approval of the Board of Health.

Extra Heavy Pipe.

Section 14. In every building of four stories or over the use of what is known to the trade as "extra heavy pipe" shall be required for the sewer, soil and waste pipes, and the fittings to same shall be "extra heavy." The vent pipes may be of the standard weight, or, as provided for in these rules, wrought iron pipe may be substituted in lieu of cast iron pipe.

When leader pipes exceed 50 feet in length, reckoning from the top of the leader head to street level,

"The Utilization of Space." Here is shown the interior office arrangement in the thriving establishment of J. J. Buckius at Pasadena, Cal., who is seen at the cash drawer.

then the entire leader must be of cast iron (extra heavy) or wrought iron.

Soil pipe stacks continued above the highest fixture and serving as a vent pipe, or two-inch or larger cast iron serving as a vent, and where under these rules they are allowed, may be of cast iron pipe or of wrought iron pipe, but there shall not be intermediate sections of material or quality.

Old Sewers.

Section 15. When either an old or a new building is placed upon a lot, or when an alteration is made in a building which has an old sewer or drain lying within the lines of any part of the foundations, then the said sewer or drain must be replaced with cast iron pipe and be run in accordance with these rules and regulations.

Coating of Pipes.

Section 16. Excepting where galvanized wrought iron pipe and fittings are used, all iron pipes and fittings used for sewer, drain, soil, waste and leaders must be coated both inside and outside with coal tar pitch applied hot.

All vent pipes and the fittings to same of an inside diameter less than two inches shall be of galvanized wrought iron and malleable iron respectively, and shall comply with these rules as to angles and the precipitation of sediment.

Vent pipes may be of lead, but only for branches not exceeding five feet in length and where used to connect with cast or wrought iron pipe.

Graded Fittings.

Section 17. When wrought iron pipe is used for sewer, drain, soil, waste or leader pipes it shall be of the quality known as "Standard" thickness, and all changes of direction shall be made with Y's 1-16, 1-6 or 1-8 fittings, threaded on the inside, and so constructed as to form a bore uniform with the pipe, without any burrs or recesses.

Where architectural conditions render it impracticable to comply with the strict requirements of these rules as pertains to angle of fittings, then they shall be complied with as nearly as practicable, just as is required for cast iron.

Leader Pipe Connections.

Section 18. Wherever practicable and where under these rules and regulations lead waste pipes are used, it must intersect at the same angles as given by Y's, 1-16, 1-6, 1-8 bends.

All connections of lead pipe with either cast iron or wrought iron pipe must be made with brass ferrules of the same size as the lead pipe, and must be connected to same by a wipe joint and be properly caulked with oakum and molten lead.

No Flues for Sewer Ventilators.

Section 19. No brick nor sheet metal nor earthenware flue shall be used as a sewer or drain ventilator, nor shall any chimney flue be used for this purpose.

Rain Water Leaders Inside.

Section 20. When rain water leaders are placed inside of a building or when passing through a porch, they must be of either cast iron or of wrought iron, and be properly caulked with the oakum and lead, just as if they were to be used as soil or waste pipes. Brass sleeves are prohibited.

Inside and Outside Leaders.

Section 21. When the opening of an external or internal rain water leader is at a point within 12 feet of any opening of a building, or of an adjoining building, then the said leader must be satisfactorily trapped and vented and supplied with water, or it may discharge into an open hopper having an outlet which shall not be less than the diameter of the leader it serves, and the hopper shall be suitably and satisfactorily supplied with water by a hose bibb, all in accordance with these rules and regulations.

Excepting as provided for in these rules, rain water leaders must never be used as a soil, waste or vent pipe, nor shall a soil, waste or vent pipe be used as a rain water leader.

Rain water leaders serving a porch may discharge into a receiving hopper or scullery sink located on a porch, but it shall not be permissible to discharge a leader serving a main roof onto a porch roof and then, through the porch roof leader, into the interior fixture.

All external leaders must discharge into open trapped hoppers supplied with water by a hose bibb, or be carried by an independent drain to the street gutter.

Intercepting hoppers or slop or scullery sinks shall not be placed on shelves nor on brackets and similar, for the purpose of receiving the discharge from the leaders.

Drains for Decks, Light-Wells and Others.

Section 22. All deck drains must be properly trapped and vented and be suitably supplied with water from the nearest suitable fixture, and must be connected into sewer, drain, waste, soil or cast iron leader and conform with the requirements of these rules and regulations.

A trap must be placed as close to the deck served as practicable and in no case shall it be more than two feet distant from the drainage outlet of the deck served.

Clean-outs must be provided on the sewer side of the trap serving a deck and be made accessible. The size of the decks drain shall be of a diameter satisfactory to the Board of Health.

In all cases where a deck is drained through a trap, as required by these rules, and the trap is supplied from a fixture, then the trap serving the deck shall be vented with a vent pipe not less than two inches inside diameter.

When a deck trap is supplied from a fixture, then the waste of the fixture must connect with the inlet side of the deck's trap, and, provided the entire wastage or outlet leg of the trap to the fixture serving the deck's trap does not exceed five feet in length, then the fixture supplying the deck's trap need not be vented, but if in excess of five feet, then the supplying fixture must be vented.

To be continued.

Do not talk about your troubles, because the fewer people who know of the things that have handicapped you the better it is for you. You will then be spared the influence of the unfortunate suggestions which your story makes on other people's minds.

Domestic Engineering's Data Sheets

19

Jan. 2, 1909

These sheets may be had printed separately for preservation in a binder. Price 10 Cents
Published by Domestic Engineering, Chicago, 1909

QUICK METHODS

for arriving at amounts of Direct Radiation for Heating by Steam and Hot Water.

Contributed by John S. Brennan, of Milwaukee, Wis.

DIRECT RADIATION.

Determine wall exposure, reduce wall surface to glass equivalent by dividing 10 if wall 8″ to 10″ dividing 15 if wall 12″ to 26″ dividing 20 if wall 26″ to 38″

Add glass surface to this and multiply product by 75 (cu. ft. air 1 sq. ft. glass will cool per hour).

Add to this cubic feet and have total quantity of air to be heated.

Add 10 per cent for every degree below zero. Multiply by decimals.

HOT WATER.

Water in radiators	160°	by .0092.
" " "	170°	" .0081.
" " "	180°	" .0072.

Steam X by .0052.

Another rule which is similar is called "Thompson's Rule," based on temperature differences, as follows:

Rules Nos.—	1	2	3	4	5	6	7
Temperature difference desired	30	40	50	60	70	80	90
Multiply sq. ft. glass by	2	42	52	62	72	82	92
Multiply sq. ft. ex. wall by	10	13	16	19	22	25	28
Multiply C. Et. contents by	0.6	0.8	1.0	1.2	1.4	1.6	1.8

Divide sum total of these results by 240 for steam radiation.

Divide the sum total of these results by 150 for water radiation.

Double exposed wall surface if of poor construction.

Double cubic feet contents for two changes per hour.

Add 50 per cent. for Indirect; 25 per cent. for Semi-direct; 50 per cent. for Boiler Capacity.

The first row of figures in this table are simply the numbers of the different rules or factors. If the temperature outside is 10° below zero and an inside temperature of 70° is desired, use Rule No. 6, which is for a temperature difference of 80°. You would multiply the total glass surface by 82, the total net wall exposed by 25 and the cubic contents of air space in the room by 1.6. For steam radiation the sum total of the three results obtained would be divided by 240; for water by 150.

If the temperature outside is 10° below, and you desire 60° inside, use factors under Rule No. 5.

If the temperature outside is 10° above, and you want 50° inside, use factors under Rule No. 2.

The rule is a very sensible one, being based on the fact that steam at two pounds pressure will produce in a certain space 240 B.T.U.'s per hour (hence the necessity of doubling the cubic contents of air space if two changes per hour are desired), and it is figured that glass surface will exhaust 82 B.T.U.'s per hour, wall surface 25 B.T.U.'s per hour, and space or cubic contents 1.6 B.T.U.'s, when there is a difference of 80° in temperature outside and inside. These factors change with temperature difference. Good judgment must be exercised in making allowance for extraordinary conditions. Until experience teaches greater accuracy by your own "Rule of thumb."

Trapping and Venting Bar and Soda Sink Fixtures

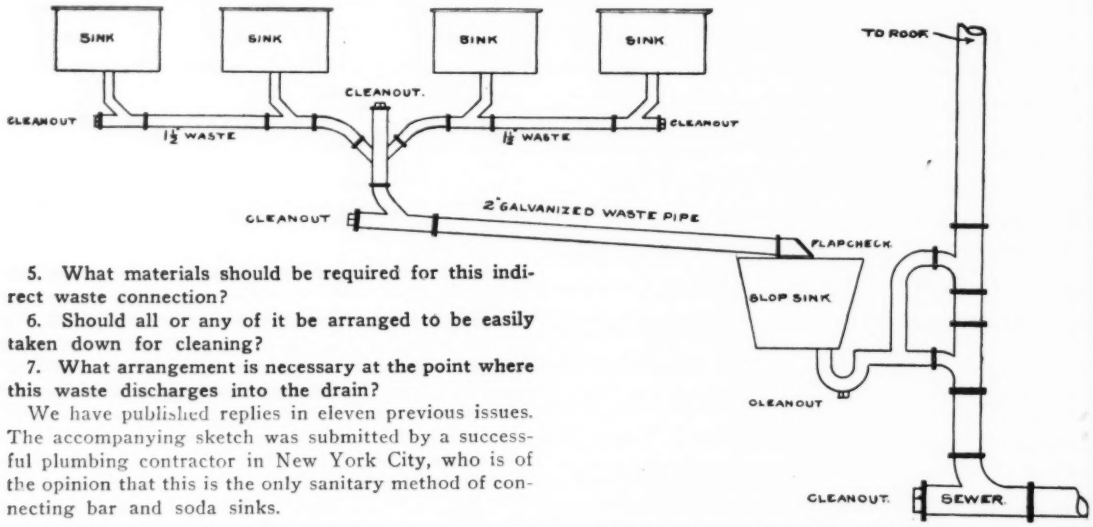
There seems to be no required practice in relation to trapping and venting fixtures which have indirect connections, such as bar and soda sink fixtures. We have, therefore, addressed the following questions to a number of persons, requesting their opinions as to the best practice:

1. Should indirect connection with the drain be approved for bar and soda glass sinks?

2. Must a trap be required near the fixture?

3. Shall such trap, if required, be vented?

4. Does it make any difference whether the waste be long or short as to venting the trap?



Sketch submitted by John J. McVea, a master plumber and sanitary expert, of New York City, who maintains that this is the only sanitary method of connecting bar and soda sinks.

5. What materials should be required for this indirect waste connection?

6. Should all or any of it be arranged to be easily taken down for cleaning?

7. What arrangement is necessary at the point where this waste discharges into the drain?

We have published replies in eleven previous issues. The accompanying sketch was submitted by a successful plumbing contractor in New York City, who is of the opinion that this is the only sanitary method of connecting bar and soda sinks.

Questions and Answers

WHAT IS THE STEAM BURSTING PRESSURE OF THIS CAST IRON BOX?

St. Louis, Mo.—To the Editor of "Domestic Engineering." Sir: Will you kindly tell me what the steam bursting pressure is in a cast iron box, 18 inches long, 8 inches wide and 6 inches deep, the thickness of the metal being ⅜ inches? Any light on this subject will be greatly appreciated by, yours truly,

A. D. C.

Answer.

This is a problem in strength of materials, and one that has not as yet been given a satisfactory solution. The large side, i. e., 8"x18" is actually a plate under a uniform bending stress fixed on all sides. Lanza gives a solution of bursting pressure of a plate of this kind after a large amount of mathematical work, but when applied to practice requires about as much work as the derivation of the formula itself, and then practically proves incorrect to a certain degree. There are some rules adopted from practice, but these all vary to such an extent as to prove worthless as far as finding the bursting pressure is concerned. Up to date there is no positively reliable formula from which to solve this. All that is possible to obtain is a safe working pressure.

Dr. Grashof also gives a formula for the bursting pressure of circular plates and square plates fixed on the edges.

Probably the best approximate rule to use is the formula for strength of a beam 1" wide ⅜" thick fixed at both ends. The length of the beam would be 8" in the above problem. This formula for cast iron is $P=\frac{40000d^2}{l^2}$, where P equals bursting pressure per square inch, d equal depth of plate in inches, and l equal length in inches. For the above problem P would equal 88 pounds per square inch. A factor of safety at least eight should be used making the safe working pressure 11 pounds per square inch.

FORMULA FOR FIGURING RADIATION.

Springfield, L. I.—To the Editor of "Domestic Engineering." Sir: Kindly tell me where I can secure a formula for figuring radiation for steam and hot water for direct and indirect systems. I need one that is approximately right so that I can guarantee to heat any house I figure on. C. H. J.

Answer.

A very good rule for figuring radiation is what is known as Carpenter's rule, as follows:

For hot water heating, radiation equals 4/10 (glass plus 1/4 the wall plus 2/55 contents). Where the glass and wall are in square feet, actual exposed net surfaces.

For steam use 28/100 instead of 4/10 in front of the parenthesis. This rule is used by an engineer of one of the largest flat building owners in this country, and has been found to give uniform satisfaction.

Wholesale Plumbing

The Acme Specialty Company, of Boston, has been incorporated, with a capital of $25,000, to manufacture plumbing specialties. The incorporators are Joseph Lund, James F. Barrett and O. T. Galvin.

The Becker Mill Company, of Marietta, Ohio, by R. R. Schultz, makes the following prediction: "The year 1909 is going to be the best year we have experienced for a long time, as this is what the trade confidently expects, and confidence is a great thing for the business world."

The highest offer obtained for the McElwaine-Richards Company's plant at Noblesville, Ind., which was offered for sale last week, was $122,100. The Superior Court of Marion county. Ind., in which the receivership is pending, has continued the confirmation of the sale for thirty days.

The increase in freight rates that is scheduled to be placed into effect by the railroads entering California commencing with the first of the year is meeting with a storm of disapproval from shipping interests in San Francisco, and one of the most spectacular fights ever waged over freight rates is now in full swing. The various commercial organizations of San Francisco have commenced the fight, and this is now being taken up by shippers throughout the state. Meetings have been held between the representatives of the shipping interests and the railroads, but nothing of importance has developed at these meetings, and from all appearances it is the decision of the transportation companies to place the increased rate into effect. The traffic bureau organized by the members of the Merchants' Exchange some time ago is most active in the present campaign and has just announced the selection of a traffic manager to lead the fight for them. The man selected is William R. Wheeler, who for many years was general manager here for Holbrook, Merrill & Stetson, and who furnished the Interstate Commerce Commission with a vast amount of information on transcontinental rates. At the present time Mr. Wheeler is assistant secretary of commerce and labor at Washington, but as the new position offers a yearly salary of $15,000 as compared with $5,000 which he is now getting, it is considered that he will accept the offer and return to his home city. While the increased rate chiefly concerns eastbound shipments, it is conceded by many that as soon as this rate is in operation it is quite likely the plan of the transportation companies to make a change in west-bound rates. Senator Fulton, of Oregon, is preparing to introduce an amendment to the interstate commerce law, and letters and telegrams are pouring in upon Senators Perkins and Flint and the California members of the House, urging them to support it. At present if a railroad wants to increase a rate it must give the Interstate Commerce Commission thirty days' notice. Not until the advanced rate becomes effective can the commission hear evidence about the propriety of the increased rate and order it reduced or canceled. By the Fulton amendment the commission can take testimony regarding the reasonableness of a rate and order it reduced or canceled before the expiration of the thirty days.

Wholesale Heating

Robinson Furnace Company, of Chicago, has been incorporated with a capital of $30,000, to manufacture heating apparatus. The incorporators are Edward H. Robinson, Frank E. Robinson and J. E. Pierson.

The Morgan Vacuum Valve Company, of Rochester, N. Y., has been incorporated, with a capital of $75,000, to manufacture heating specialties. The incorporators are John B. Morgan, Josephus Albee and Geo. G. Ford, all of Rochester, N. Y.

The Instantaneous Water Heating Company has recently moved its office and factory from Chicago to Kalamazoo, Mich. With lessened expense for doing business and with better facilities, the company expects to be able to serve its customers better than ever before.

James Doherty, formerly secretary of the Doherty Manufacturing Company, of Sarnia, Ont., and for the last twelve months connected with the Chicago office of the International Heater Company, of Utica, N. Y., has just been advanced to the position of assistant manager of the Chicago office of that company, of which D. E. McCabe is general manager. Mr. Doherty has made a host of friends while in Chicago, who will be glad to hear this good news about him.

Kellogg-Mackay-Cameron Company, of Chicago, Minneapolis and Seattle, has just made arrangements for the erection of a new four-story reinforced concrete building at Minneapolis, designed exclusively for its line of business. The new structure will be located on a sidetrack of the Chicago, Milwaukee & St. Paul Railway at the corner of Ninth avenue and Fourth street South. It will be equipped with all modern improvements for the economical handling of pipe, fittings, radiators, boilers, plumbing supplies, etc. The company is also adding facilities for cutting pipe to measure for its trade in that section. In addition to the building there is to be a large pipe shed for soil and wrought iron pipe, a commodious yard and teaming track between the shed and the main building. The company has also made arrangements for covering a larger territory in the Northwest than heretofore by engaging three extra traveling salesmen, who will devote their energies to the country traversed by the Chicago, Milwaukee & St. Paul Railway.

Steam and Mill Supplies

The James Supply Company, of 1106-1112 Market street and 231-233 Eleventh street, Chattanooga, Tenn., has added a complete line of machinery and mill supplies to its business.

The Standard Emery & Polishing Wheel Company, of Springfield, Mass., will move its plant to Coxsackie, N. Y., where it has leased a factory building on Riverside avenue, which it will remodel and equip for manufacturing.

The Columbian Iron Works, of Chattanooga, has been incorporated, with a capital of $125,000, to manufacture machinery and steam supplies. The incorporators are H. M. Lofton, George M. Guild, C. D. Richmond, Charles A. Lyerly, Theodore Richmond and W. E. Miller.

The Standard Chain Company, of Pittsburgh, Pa., operating the Standard Chain Company, of Canada, Ltd., Sarnia, Ont., Canada, which plant was partially wrecked by high winds recently, has completed rebuilding the damaged sections, and this plant is now in full operation.

The Syracuse Die Molded Casting Company, of Syracuse, N. Y., has been incorporated with a capital stock of $10,000, to manufacture finished castings from dies, requiring no machine work. The company has leased a portion of the factory building at 303 Wallace street, and for the present will confine itself to producing difficult parts of machines made of aluminum or an alloy equal in strength to ordinary brass castings. All machine work, including the dies, will be done outside. O. M. Gale is president and treasurer; O. E. Stowell, vice-president, and L. H. Johnston, secretary.

A petition in bankruptcy has been filed against the American Diesel Engine Company, manufacturers of oil and gas engines at 11 Broadway, New York City. The liabilities are said to amount to more than $200,000, and the assets are stated to exceed $100,000, consisting of cash, accounts and bills receivable; engines, machinery, parts, contracts for engines and personal property in New York state, Rhode Island, Indiana, Missouri, Wisconsin and Texas. The company is a New York corporation, organized on December 6, 1901, with a capital stock of $250,000. It succeeded to the Diesel Engine Company, of which Adolphus Busch, the St. Louis brewer, has been president. He was the principal stockholder and financial backer of the American Diesel Engine Company, and was president until a few weeks ago, when he resigned on account of ill health. Charles Nagel was vice-president and Edward Meier secretary and treasurer. The company formerly did a large business, but during the past year it is said the volume of business fell off considerably.

Metal Market

New Year Metal Market, December 29.

Copper, Prime Lake	$14.50
Copper, Lake, Arsenical brands	14.50
Copper, Electrolytic	14.12½
Antimony, Cookson's	8.12½
Lead	4.15
Straits Tin	29.15
Spelter	5.10

Chicago Iron Market, December 30.

Southern, No. 2 Foundry	$17.35-17.85
Northern, No. 2 Foundry	17.00-17.50
Lake Superior Charcoal	19.50-20.00

December 30, 1908:

Foundry iron was the same price as the week previous
$5 less per ton than the year previous
Copper was ½c more a lb. than the month previous
⅞c more a lb. than the year previous

Boston, Mass.—As a rule, producers are very confident that the metal market will be higher after the first of the year, and they are persistently refusing to meet bids an eighth to a quarter of a cent below the market, says Walker's Copper Letter. Consumers are buying almost no copper at present, many of them still believing that they will be able to fill their requirements soon at around 14 cents. There has been a slight improvement in the tone of the foreign market. It is understood that the recent bear raid in the London speculative market failed to bring about the expected selling, and that the shorts are availing themselves of every opportunity to cover their contracts with small losses. The foreign business outlook is brighter even than it was a year ago. There will be heavy expansion along electrical lines the world over, and a very large proportion of the equipment and supplies will be bought in Great Britain, Germany and the Netherlands, and two-thirds of the copper will be supplied from this side of the Atlantic.

Personal

A. G. Cripps, vice-president and sales manager of the Prudential Heating Company, of Akron, O., was in Chicago one day last week and called on a few of his many friends in the trade.

W. G. Titus, of the Trenton Potteries Company, of Trenton, N. J., is making preparations for a trip to Cuba. He expects to sail from New York on January 30 and to arrive in Havana on February 4.

G. Schumacher, general manager of the Union Foundry Company, of Anniston, Ala., spent his Christmas with relatives and friends in Wisconsin, and he was in Chicago last Wednesday and called on some of his friends here.

Oscar J. Zimmerman, a master plumber, whose establishment is located at 337 North Main street, Decatur, Ill., gave away half of his business to two of his oldest employes as a Christmas present, each receiving an individual one-fourth interest in the plumbing establishment. As the business is in a prosperous condition these gifts were probably the most valuable made in that part of the country for Christmas. The two lucky men were Herbert C. Bush and David M. Peters. Mr. Bush has been Mr. Zimmermann's bookkeeper for seven years, and Mr. Peters has served him twelve years as a journeyman plumber. Mr. Zimmermann is a member of the Decatur Master Plumbers' Association.

Association News

Kansas City, Kans.—The Kansas State Association of Master Plumbers will hold its next annual meeting in this city on Monday and Tuesday, March 8 and 9. The headquarters of the convention will be the Grand hotel.

New Britain, Conn.—The Master Plumbers' Association of this city has elected officers for the ensuing year as follows: President, C. A. Ericcson; vice-president, Harry Damon; financial secretary, Thomas Quinlivan; treasurer, Timothy E. Burns, and sergeant-at-arms, Terence Riley. It was voted at the meeting to hold a banquet on Tuesday evening, January 12.

Chicago, Ill.—The Chicago Master Plumbers' Association will hold its annual meeting on Saturday evening, January 9, 1909, in its hall in the Schiller building on Randolph street. Election of officers and other

matters of importance will come before the meeting, and it is therefore desirable that every member should make an effort to be present. The meeting will be followed by the excellent German lunch which has now become an annual social event so attractive that no one will like to miss it. A vaudeville program by high grade artists will wind up the meeting.

New York, N. Y.—Through the efforts of T. A. Hill, I. J. Brown, B. F. Donohoe and T. S. Cochrane, Jr., of this city, the master plumbers of New Rochelle, N. Y., have been organized. These gentlemen made a trip to New Rochelle on Wednesday evening, December 23, and as a result the new association was organized, with a membership of fourteen, and the prospect of ten or twelve more being added in the near future. Daniel Cunneen, of Peter Cunneen & Company, 33 Rose street, has been elected president, and Joseph F. Carr, of 38 Worth street, is secretary. All the members are enthusiastic over their new local, and feel greatly indebted to their New York friends for their successful organization. After the meeting, on December 23, those present enjoyed a spread provided by the New Rochelle master plumbers.

CONVENTION DATES.

January 12, 13 and 14, 1909.—Annual convention of the **Iowa Master Plumbers' Association,** at Dubuque, Iowa. Headquarters at the Hotel Julien.

January 19 and 20, 1909.—Annual convention of **Wisconsin Master Plumbers' Association,** in Milwaukee, Wis. Headquarters at the Plankinton House.

January 19-21, 1909.—Fifteenth annual meeting of the **American Society of Heating and Ventilating Engineers,** in New York City.

January 20 and 21, 1909.—Annual convention of the **Illinois State Association of Master Plumbers,** in Peoria, Ill.

February 8, 9 and 10.—Fourth annual meeting of the **American Society of Inspectors of Plumbing and Sanitary Engineers,** at Omaha, Neb. Headquarters at the Rome hotel.

February 16 and 17, 1909.—Eighteenth annual convention of the **Ohio State Association of Master Plumbers,** at Armory Hall, Springfield, O. Headquarters at the Arcade Hotel.

March 8 and 9, 1909—Annual convention of the **Kansas State Association of Master Plumbers,** at Kansas City, Kans. Headquarters at the Grand hotel.

Plumbing Inspection

Omaha, Neb.—The American Society of Inspectors of Plumbing and Sanitary Engineers will hold its fourth annual meeting in this city on Monday, Tuesday and Wednesday, February 8, 9 and 10, 1909, making its headquarters at the Rome hotel. The program committee, consisting of Vice-president Charles B. Ball, chief sanitary inspector of Chicago, chairman; Jno. K. Allen, editor of "Domestic Engineering," Chicago, and Harry W. McVea, plumbing inspector of this city, has already received assurances of some very valuable papers, and it is quite certain that the program will rival in interest the one of last year.

Who's Who in America—VII

Lloyd Garrison McCrum, president of The McCrum-Howell Company, of New York City, Uniontown, Pa., and Norwich, Conn., was born in Stewart Township, Fayette County, Pa., August 7, 1877, and secured his education at the California State Normal School, California, Pa.; Ohio Normal University, Ada, Ohio, and Pennsylvania State College, State College, Pa., completing a special course at the latter institution in 1895. In 1896 he was instructor in mathematics in the Mt. Pleasant (Pa.) Institute. His susceptibility to politics carried him into the presidential campaign that year, and as he was a ready talker and a good thinker for a lad of his age and experience, the managers of the republican party put him on the stump in Fayette County. After the election he served as a reporter for the News Standard, Uniontown, Pa., until 1898, when he was appointed assistant postmaster in that city at a salary of $900 a year. He remained in the postal service only nine months, or until May, 1899, when he resigned to accept the position as manager of the plant of the Acme Radiator Company at Uniontown. This plant had been established in 1896, and not having had a prosperous career at all it was sold at a receiver's sale to Evans Lynn, of Uniontown. Mr. McCrum in May, 1899, organized a company and purchased the plant from Mr. Lynn. They new company put up $28,000, and the concern got solidly on its feet, making money from the very outset under the energetic and careful management of Mr. McCrum. The name of the concern was changed to that of the Uniontown Acme Radiator Company, and its output in a short time increased from 1,000 to 15,000 feet per day. In 1902 Mr. McCrum and his partners sold the plant, and the next year a new partnership was formed by Mr. Mc-

Crum, Geo. D. Howell, C. V. Kellogg and W. K. Pierce, which bought the enamelware plant of the Champion Manufacturing Company at Blairsville, Pa. In March, 1904, Mr. Howell, Mr. Kellogg and Mr. McCrum bought the plant and all the interests of the Richmond Company, manufacturers of boilers and furnaces at Norwich, Conn. Mr. Pierce was not in this deal. In May of the same year Messrs. Howell, Kellogg and McCrum bought back the Uniontown Radiator plant from the Federal Boiler and Supply Company. Then in the month following they organized the Kellogg, McCrum, Howell Company, and sold to it the radiator plant of Uniontown and the enamelware plant of Elairesville and the boiler and furnace plant at Norwich. But there was still one more change to be made, and this happened in April, 1906, when Messrs. Howell and McCrum bought Mr. Kellogg's interest and changed the name to the McCrum-Howell Company, as it is now. Besides being president of this company Mr. McCrum is also director of the Tower Hill Connellsville Coke Company and the Thompson Connellsville Coke Company. He makes his business headquarters at the general offices of the McCrum-Howell Company, 46-48 East Twentieth street, New York City. Mr. McCrum is a member of the American Society of Heating and Ventilating Engineers, the Masonic fraternity, the Duquesne Club, of Pittsburg, and the Aldine Club, of New York. In 1900 he married Miss Iola Reid, of Philadelphia, and they reside at the Apthorp Apartment in New York City.

The Middle States

Bellaire, O.—The Vance Plumbing Company, of this city, has been incorporated, with a capital of $1,500. L. Vance is at the head of the new enterprise.

Cleveland, O.—R. H. Blatt, who last summer purchased the plumbing and heating establishment of the late P. E. Noland, is doing a very nice business.

Cleveland, O.—D. H. Roberts is at present engaged with the plumbing of three new houses for J. N. Roy on East 107th street, and the plumbing for H. E. Chapman on East 100th street.

Conneaut, O.—Burrell & Kehoe are installing the plumbing and heating in the new addition to the Conneaut Can Company's plant, the heating in Cleveland Gas and Electric Fixture Company's building, and in new Eagles' Hall, and the plumbing in four nice bathrooms.

Cleveland, O.—The Windermere Plumbing Company at 13550 Euclid avenue has reason to be well satisfied with the portion of work which has been coming its way. The plumbing in the new residence of Mrs. John Hay is being installed by this firm. In addition to this they are doing the remodeling in the residence of D. C. Westonshaver on East Ninety-third street, plumbing for S. S. West and plumbing and heating for J. H. Doneghy.

The Esswein Christmas Banquet.

Columbus, O.—It was the same old circle of good fellows, with a few new faces added to them, that gathered about the banquet board at the sixteenth annual banquet tendered to its employes by the Samuel Esswein Plumbing and Heating Company at Schenck's hall on Christmas evening. That time-honored saying, "Is Everybody Happy?" figuratively had the spots knocked from it when the spirits of the gay assemblage of employes and friends of Samuel A. Esswein, 200 strong, broke loose. An informal Christmas greeting was extended to the gathering by Samuel Esswein, who came in for a generous share of applause from his appreciative employes and fellow workmen; then Harry N. Heywood, toastmaster, bade everybody "fall to" a most elaborate menu. As a token of their appreciation of this annual treat the employes, through Frank Marion, presented Mr. Esswein with a fine autometer for his automobile. Short, snappy speeches, in which much wit was spilled to good advantage, were given at intervals by Hon. L. F. Sater, "Our Man in Trouble;" Hon. Frank Marion, "Our Hunting Party;" Hon. James Butler, "Once a Year;" Hon. Phil Dreher, "How to Shoot Rabbits;" Hon. G. L. Saunders, "The Busiest Man in Town," and Hon. W. D. Collinwood, "How to Build a Skyscraper and Smoke a Pipe." Following the banquet and its excellent accompaniments, "smokes" were passed around while bursts of good music from a 13-piece band were rendered as a dessert by "Slippery Creek" players impersonating German farmers. As a windup to a most enjoyable evening, a twenty-minute vaudeville sketch of singing and dancing was put on by "Six Southern Swells," under the leadership of Harry Bell. Charles Johnson of Geneva, N. Y., whose face has been a familiar one about the banquet board for some years past, was present and sang a solo entitled "That's What the Rose Said to Me." Jacob Snyder had the honor of being the oldest employe in the service of the Esswein company present. He has been connected with the firm for the past twenty years, and is classed among Columbus' veteran plumbers of the old school.

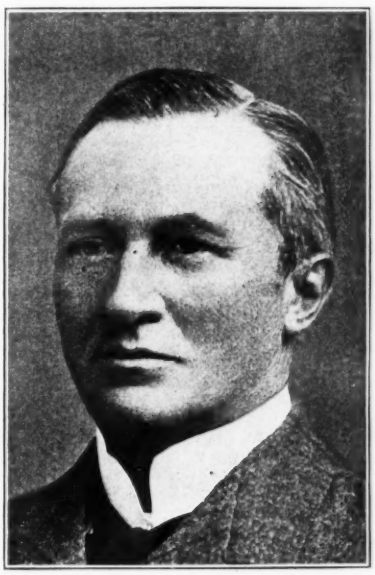
Notes from the West

Pueblo, Colo.—D. E. Burke, of this city, has been awarded the following contracts: Plumbing in the residence of Mrs. T. S. Underhill at 67 Block T, 1301 and 1303 East Fifth street; plumbing in residence of Jos. Mudd, 1221 Cedar street; plumbing in residence of Mrs. Thos. Gilbert at 919 East Evans avenue; plumbing in residence of M. Williams, 1208 Berkley avenue; plumbing in residence of W. F. Cambron, 1604 West 18th street; plumbing in residence of A. J. Langdon at Ninth and Greenwood; plumbing and heating in residence of J. A. Johnston, 813 East Fifth street; plumbing in residence of L. M. Keiffer, 1501 East Eighth street; plumbing in residence of J. R. Johnson, 1612 East Eighth street; plumbing in residence of S. A. Miles, 1231 Orman avenue; plumbing and heating in the residence of M. Bernstein, 119 West Eleventh street; plumbing in the residence of C. D. Gettings, 1409 East Eighth street; plumbing in residence of James Phares, 1115 West Eleventh street; plumbing in office of Dr. Shaw, 210 North Main street; plumbing in the Jos. Schlitz building at 215 North Main street; plumbing in residence of W. Davey, 216 Van Buren street; plumbing in residence of A. R. Young, 321 Victoria avenue; plumbing in residence of S. P. Shaw, 1712 West Eighteenth street; plumbing in residence of H. E. Bierman, 203 West Third street; heating in residence of T. E. Burch, corner Lake and Orman avenues; plumbing in residence of E. Anderson, 1425 East Fifth street; plumbing in the Elks' Club building, corner Fifth and Santa Fe

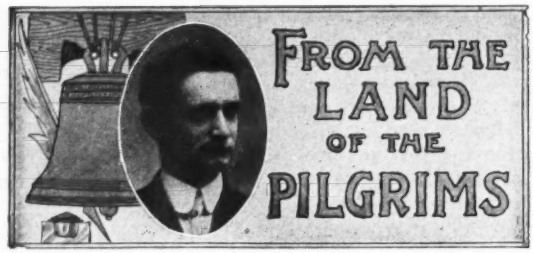
avenue; plumbing in residence of Lawrence Murray, 14 Block U; plumbing in residence of Clark Gettings, 1208 East Eighth street; plumbing and heating in the Missouri Pacific, Union avenue and E street; plumbing in the handsome residence being built by Geo. E. King at corner Eighth and Prospect street. **The Francis Plumbing & Supply Company** has secured the following contracts: Plumbing in residence of V. G. Hills, 907 South Union avenue; plumbing in residence of John Hugh, 1658 East Fifth street; plumbing in two houses at corner Seventh and Summit, owned by Osborne & Kilburn; plumbing in residence of Thos. A. Spear, 608 Summit street; plumbing in residence of D. C. Morris, 1812 Cedar street; plumbing in garage being built by Ed. Fist at 747 West Abriendo; plumbing in residence of Mrs. Francis Hart, 423 West 18th street; plumbing in office building owned by Highberger & Francis, at 412 Santa Fe avenue; plumbing in residence being built by the Union Land & Investment Company at 1009 West 14th street. **James English** has the following work on hand: Plumbing in residence of Mrs. H. Potger, 1707 Spruce street; plumbing in residence of W. L. Lashlee, 1323 East Eighth street. **The L. F. Wade Plumbing & Heating Company** has secured the following contracts: Plumbing in residence of Mrs. James, 1043 Cedar street; plumbing in residence of C. I. Crockett, 408 West 17th street; heating in the Elks' Club building at corner Fifth and Santa Fe avenue; plumbing in residence of Geo. Gill, 709 Center street; plumbing in residence of Geo. L. White, 1403 East Ninth street; plumbing in the handsome residence being built by Mills & Payne at corner Sixth and Seminary; plumbing in the office building of the Prudential Insurance Comany at 217 North Union avenue; plumbing in residence of Frank D. Johnson, 2609 Fourth avenue; plumbing in residence of R. D. Frazier at corner 21st and Elizabeth streets; plumbing in the building of the N. O. Nelson Mfg. Co. at 115 East River street. **James Howlett** has secured the following contracts: Plumbing in residence of A. Youngren on East Ninth street; plumbing in residence of H. C. Schmidt at corner Evans avenue and Fairview street; plumbing in office building of Fred Meisler at 326 North Santa Fe avenue; plumbing in residence of B. Sweeney, 1211 East Fifth street; plumbing in residence of Mrs. Dr. Heller at corner Eighth and Summit streets; plumbing in residence of F. A. Smith, 1931 Claremont avenue; plumbing in residence of J. A. Connors, 1122 Orman avenue; plumbing in residence of J. H. Helwig, 2431 Fourth avenue; plumbing in office building being erected by D. R. Green at 117 Fifth street. **J. H. Phillips** has the contract for plumbing in residence of J. D. Mottice at 22 Block L. **The Pueblo Plumbing Company** has secured the following contracts: Plumbing and heating in the handsome residence being built by R. H. Hirsch at 508 West Abriendo avenue; plumbing in residence of Joe Hochamen, 2616 Grand avenue; plumbing in residence being built by T. L. Lewis at corner 11th and West streets; plumbing and heating in the building of Nuckolls Packing Co. at corner Third and Greenwood streets. **B. R. Long** has secured the contract for the plumbing in two houses owned by A. McClelland at 1306 and 1308 Wabash avenue. **J. Jerman** is doing the plumbing in residence of M. Novat at corner Locust and Stone avenues; also the plumbing in the office building of Leaser & Co. at 208 West Northern avenue. **L. Rees** has the following work on hand: Plumbing in residence of A. F. Ogrenat, 1023 East Abriendo avenue; plumbing in residence of Robert E. Rice, 415 Michigan street; plumbing in residence of E. M. Mourning, 1805 Pine street; plumbing in residence of A. F. Pinkerton, 1039 East Abriendo avenue. **S. F. Goss** has secured the following contracts: Plumbing in residence of M. T. Offenkamp, 633 Jackson street; plumbing in residence of M. Sullivan, 1100 Block, Lake avenue; plumbing in the First Congregational Church, at corner of Evans avenue and Jackson street. **Chas. Geiser** has the following work on hand: Plumbing in residence of J. P. Reader, 1436 East Eighth street; plumbing in residence of W. Joxen, 1329 East Seventh street; plumbing in residence of Chas. Hager, 1607 East Fourth street.

Master plumbers and master steam-fitters are earnestly requested to send us reports of the award of plumbing and heating contracts of $1,000 or more, as soon as these have been awarded, while the information has news value. Kindly address Editor "Domestic Engineering," 49-53 N. Jefferson street, Chicago.

Who's Who in Britain—XII



Peter Fyfe, Chief Sanitary Inspector for the City of Glasgow, was born in Glasgow in 1854, and had some experience in America. He was trained as an engineer, and entered the service of Glasgow Corporation in 1879, reaching his present position six years later. Mr. Fyfe is a past president of the Sanitary Association of Scotland and a Fellow of the Royal Society of Edinburgh, and he is well known in sanitary circles.



Fryeburg, Me.—S. H. Nicholson has opened a hardware, plumbing and steam fitting establishment here.

Malden, Mass.—Alton S. Smith, a local plumber, has filed a petition in bankruptcy. He owes $2,290 and has no assets.

Springvale, Me.—James Makin has the contract for the installation of a steam heating plant in the residence of A. L. Bradbury at Hollis.

Boston, Mass.—Frederick E. Rogers, plumber, of 10 Kingsley street, has filed a petition in bankruptcy. He owes $2,891 and has assets of $727.

Medford, Mass.—Oscar J. C. Neilson & Co., plumbers, suffered considerable damage from a fire in their building on the day before Christmas.

Boston, Mass.—The plumbing establishments of David E. Mulcahy and John Gerrity at Brighton were damaged by fire on the morning of December 20.

Springfield, Mass.—A new heating system is to be installed in the Park Street Congregational church to replace a condemned one. The contract has not yet been let.

Stockbridge, Mass.—H. B. Parsons has been awarded the contract for installing a steam heating plant and overhauling the plumbing in the Joseph H. Choate estate on Main street.

Chicopee, Mass.—Joseph Morgan of West Springfield has awarded the contract for the installation of new plumbing in one of his tenement houses on Chestnut street to Gabriel Benn & Son.

New Haven, Conn.—The New Haven house is to be enlarged from its present 225 rooms to 400. An electric lighting plant, heating and cold storage plants will be installed. William H. Mosely is manager of the hotel.

Chelsea, Mass.—The Odd Fellows building, one of the buildings destroyed by the great fire of last April, is being rebuilt. The contract for the plumbing has been placed with A. K. Mann & Co. of 403 Broadway, Chelsea, and that for heating with Lasker & McMurrer of Boston.

Bridgeport, Conn.—H. D. Fitzgerald, Inc., is the name of a company which has just been incorporated to engage in the plumbing business in this city. Those interested in the venture are H. D. Fitzgerald, H. J. Donahue and Edward K. Nicholson, all of this city. The capital stock is $10,000.

Fitchburg, Mass.—It is believed that a plumber will be selected for a place on the board of health for the year 1909 by the mayor. The term of Dr. Robert A. Rice expires with the old year, and, as the health board has never had a plumber on it, strong influences have been brought to bear to secure such an appointment. It is generally believed that the man will be either Charles Smith or James W. Malone.

Taunton, Mass.—One of the first matters which Mayor Crossman plans to take up with the opening of the new year is the investigation of the heating plants in the various school houses. As fast as the financial resources of the city will permit, important changes will be made. In many of the schools the heating arrangements are not only very antiquated, but very dilapidated. Repeated patching has left the furnaces in bad condition, and in some of the schools where second-hand furnaces were installed years ago more modern plants are badly needed. It is likely that two or three of the buildings at least will be re-equipped during the coming year. **A. H. French.**

James McGivney, a well known master plumber, of Oakland, Cal., and at one time a political leader of that city, passed on at his residence there on Friday, December 18. He was 66 years of age and had no family.

Trade Literature

From the Revere Rubber Company of Boston, Mass.: Calendar for 1909, size 18x22 inches, printed from very large and plain type, which makes it valuable for large offices or shops where it is desirable to see dates at a distance.

From Warren Webster & Company, of Camden, N. J.: "The Webster System of Steam Circulation for Heating Purposes," 6x9 inches, 32 pages. This is a neatly gotten up catalogue illustrating and describing in detail the Webster heating system.

From the Electric Heat Regulator Co., of Minneapolis: "The Minneapolis Heat Regulator," a neat booklet describing and illustrating the company's automatic temperature regulators for steam and hot water heaters, gas and steam valves, and for hot air furnaces.

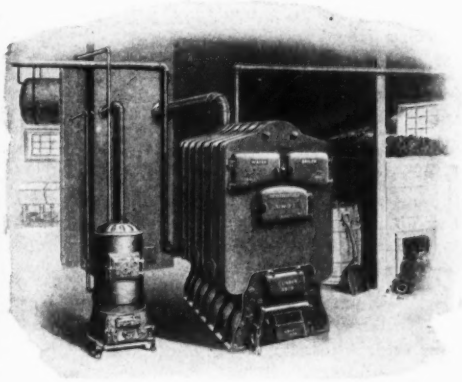
From the Civic League, of St. Louis, Mo.: "Public Comfort Stations for St. Louis," 6x9 inches, 30 pages. This is a carefully prepared report of a thorough investigation made in that city along the line of public conveniences, and it covers the entire subject in a most creditable manner. This investigation was an outgrowth of the work done here in Chicago.

From the Kellogg-Mackay-Cameron Company of Chicago: "Hidden Masterpieces," an exceedingly attractive wallhanger on heavy card board, size 10x14 inches, illustrating the Maison Blanche, a twelve-story office building at New Orleans, La., and also the boiler room of that structure showing the battery of five American boilers which supply the building with heat.

From Thomas Kelly & Bros., of Congress street and Forty-sixth avenue, Chicago: "1909 Water Closet Catalogue," 6½x10 inches, 28 pages. This attractive catalogue illustrates and describes automatic seat action and frost-proof closets, some of which are designed for public buildings and schools. Much space is also devoted to illustrating and describing the firm's line of compression tanks for flushing water closets.

A Heating Reminder.

With the advent of cold weather many houseowners find their hot water coils fail to give adequate service, and frequently interfere so much with the proper operation of the boiler as to prove neither desirable nor economical. An IDEAL Water Heater, independent of the boiler or the kitchen range solves the problem.



An IDEAL Water Heater furnishes abundant hot water at all hours, day or night.

In addition to supplying hot faucet water, heating flat-irons, etc., for home use, IDEAL Water Heaters are suitable for a wide range of other purposes: for heating small enclosures, tempering large volumes of water in tanks, vats, swimming pools, etc., for manufacturing purposes and many other kinds of profitable service.

AMERICAN RADIATORS & IDEAL BOILERS

AMERICAN RADIATOR COMPANY

General Offices, 282-286 Michigan Ave., Chicago.

New York	Cincinnati	Cleveland	Atlanta	Brantford, Ont.	Denver
Philadelphia	Boston	Milwaukee	Minneapolis	Seattle	St. Louis
Pittsburg	Buffalo	Indianapolis	Kansas City	Omaha	San Francisco

New York News

Watkins, N. Y.—F. A. Haughey is placing a hot water heating system in a large greenhouse for C. S. Magee.

Ithaca, N. Y.—Masters & Son are placing the plumbing and hot water heating in a new residence for E. W. Schroder.

Watkins, N. Y.—L. H. Durland & Son Company has secured several good residence contracts for plumbing and heating work.

Bath, N. Y.—Gould & Nowlen have recently completed the installation of the plumbing and heating work in the new county jail here.

Watkins, N. Y.—Woodward & Stauffer have just secured contracts for the plumbing and heating in four flats for John Coughlin, to be built here.

Ithaca, N Y.—P. M. Donohue is engaged with the plumbing and hot water heating installations in a new $15,000 residence for E. F. Morrison, Eddy street.

Corning, N. Y.—The Lawrence Plumbing Company has secured a $7,200 contract for the plumbing, heating and ventilating of the North Side high school here.

Oswego, N. Y.—C. B. Houk is placing a hot water heating system in the high school building here and is installing an equipment of plumbing in a residence for James Walker.

Wayland, N. Y.—M. Kimmel & Company, whose hardware business in this place has grown to agreeably large proportions, will shortly equip on their premises a modern display of plumbing fixtures.

Ithaca, N. Y.—F. H. Higgins, who recently succeeded to the business of Higgins & Carman at 311 East State street, has recently completed the plumbing installation in the Y. M. C. A. building here.

Avoca, N. Y.—Walter H. Wood has experienced an exceptionally busy year, and during that time has executed an imposing list of contracts. The latest of these was a hot water heating installation in the Sturdevant Bank building here.

Dunkirk, N. Y.—George Gippel, of 337 Lion street, is at present engaged in installing the plumbing and heating in the residence of Phillip Fish, the plumbing in L. Kolpien's residence and the plumbing and heating in J. H. Fitzgerald's residence.

Dunkirk, N. Y.—The Dunkirk Plumbing and Hardware Company has the contracts for the plumbing in the new Dunkirk school building, the plumbing in the American Locomotive power house and the plumbing and heating in the Masonic Temple.

Lynbrook, L. I., N. Y.—Harvey M. Doxsey, of Atlantic avenue, who recently engaged in the plumbing and heating business, has been successful in landing some good local contracts. Among these are plumbing and heating installations in eight residences for J. Sproule & Company and five similar contracts for Charles Doxsey.

Lynbrook, L. I., N. Y.—At Union and Atlantic avenues is located the plumbing and heating establishment of John Born, who engaged in the business last June and has already captured a fair share of local trade. Mr. Born has traveled considerably throughout the eastern trade as a journeyman, and is well versed in the lines he represents.

Watkins Glen, N. Y—Chris. Grant, who has but recently engaged in the plumbing and heating business here and whose shop in this place is a model of neatness and equipment, has begun his business career under most favorable conditions. His books show a good assortment of residence work on hand, with prospects for a long continuance of prosperity.

Binghampton, N. Y.—Dean, Auchinachie & Company have lately succeeded to the plumbing and heating business of Boughton & Marland, at 197-199 State street. They are both practical men in their respective lines and will prosper in their new vocation. They would like to receive catalogues and descriptive matter from manufacturers and jobbers of plumbing and heating material. **E. De Forest Winslow.**

The Plumber's Dream.

Last evening I was talking
With a plumber aged and gray,
Who told me of a dream he had,
I think it was Christmas day.

While snoozing in his office,
The vision came to view,
For he saw an angel enter,
Dressed in garments white and new.

Said the angel, "I'm from heaven,
The Lord just sent me down
To bring you up to glory,
And put on your golden crown.

You've supported many husbands,
And worked hard night and day,
You've been a friend to everyone,
And from few received your pay.

So we want you up in glory,
For you have labored hard
And the good Lord is preparing
Your eternal just reward."

Then the angel and the plumber
Started up toward glory's gate,
But when passing close to Hades,
The angel murmured "Wait!

I have a place to show you,
It's the hottest place in Hell,
Where the ones who never paid you,
In torment always dwell."

And behold the plumber saw there
His old customers by the score,
And grabbing up a chair and fan,
He wished for nothing more.

He just sat down to watch them
As they'd sizzle, singe, and burn,
And his eyes would rest on debtors,
Whichever way they'd turn.

Said the angel, "Come on plumber,
There's the pearly gates to see,"
But the plumber only muttered,
"This is heaven enough for me."

Northern New York

Canton, N. Y.—Howe Bros. will soon start work on their plumbing contract in the new Dr. Bayson residence.

Massena, N. Y.—Dodge & Smith Company are going out of the plumbing and heating business after January 1.

Rouse Point, N. Y.—E. E. Bullis is being kept rather busy looking after his heating work this winter. He is installing a steam heating system in the Massachusetts hotel.

Potsdam, N. Y.—Irish & Jeto have moved into new and larger quarters at 129-31 Water street. They are preparing for a busy season with their plumbing and heating work.

Pulaski, N. Y.—H. R. Franklin will establish a plumbing department in his new hardware store. He is desirous of receiving catalogues and price lists from manufacturers and jobbers.

Baldwinsville, N. Y.—Arthur Aberts has recently completed the installation of a steam heating system in the Masonic Club. He has the contract for installing a modern plumbing system in the residence of Joe Heines, Jr.

Ogdensburg, N. Y.—E. J. Burns seems to be getting his share of the good things. He has just finished that Dennie street sewer job, using over 1,600 feet of 24-inch sewer pipe. Mr. Burns will start work on the Helen Hall Academy plumbing about March 1. The contract for steam heating, ventilating and plumbing at the Madison County court house was landed by Mr. Burns.

Rouse Point, N. Y.—Chilton & Jones have just nicely straightened around in their new building and are ready to handle their plumbing and heating work on a larger scale. They would like to receive catalogues and price lists from manufacturers and jobbers.

O. T. Carson.

Southern Notes

Dyersburg, Tenn.—Glenn L. Seat will open a plumbing establishment in the early part of January.

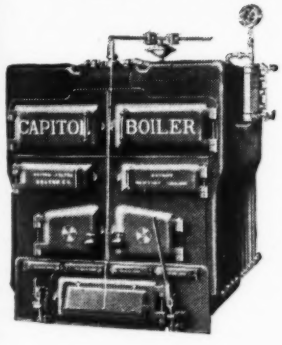
Charlotte, N. C.—Samuel J. Smith has opened a heating establishment at 309 West Trade street.

Richmond, Va.—The Morrison Machinery Company has secured the contract for the heating system for the new annex to the Library building. The consideration is $3,336.80.

Norfolk, Va.—The American Heating and Ventilating Company has been awarded the contract for the installation of a heating system in the new High School building now being erected in this city.

Winston-Salem, N. C.—The Maynard-Crutchfield Company has been incorporated, with a capital of $25,000, to conduct a plumbing business. The incorporators are F. G. Crutchfield, T. P. Maynard and A. F. Jones.

CAPITOL BOILERS AND RADIATORS



A Few Personal Reasons

why you should know more about **Capitol Boilers.** A Fitter and a helper can set up an ordinary househeating Capitol, and one less man is needed for Heavy Duty **Capitols** than for ordinary types of boilers. The light-weight units make them easier to handle. It's a "cinch" to make them tight. No "pipe headers" are necessary with **Capitol Boilers**—we've taken care of that in the construction. They are quick steamers—it's the shape of the sections. There are many other good reasons we would like to tell you about, and will, if you wish. Just send for our catalog.

United States Heater Company.

General Offices and Works: Fort St. and Campbell Ave., DETROIT, MICH.

DETROIT
NEW YORK
CHICAGO
KANSAS CITY
OMAHA

Branches:
139 Jefferson Ave.
129 Worth St.
34 Dearborn St.
120 W. 11th St.
916 Farnam St.

Sales Agencies:
ST. LOUIS, MO., L. M. Rumsey Manufacturing Co.
DENVER, COLO., Kellogg & Stokes Stove Co.
MINNEAPOLIS, MINN., Plumbing & S. F. Supplies Co.
NORFOLK & RICHMOND, VA., Virginia-Carolina Supply Co.

With the Makers

E. Stebbins Manufacturing Company to Manufacture Soderlund Specialties.

E. Stebbins Manufacturing Company, of Springfield, Mass., has just announced that it has taken over the manufacture of the Soderlund specialties, formerly made by the Union Brass Works Company, of Boston, Mass. These specialties are: Combination one-handle bath and basin fixtures, non-scalding shower-bath valves, barbers' shampoo fixtures of the one-handle type, pop-up basin wastes and high pressure ball cocks. They are all well known, but the article which has attained the widest popularity is no doubt the Soderlund anti-scalding shower-bath valve, herewith shown, which is made in such a way that, while it

The Soderlund anti-scalding shower valve.

is possible to get all the cold water desired, it is impossible to get hot water unless it is mixed with cold. This makes it absolutely impossible to be scalded in using a bath equipped with this valve. The mechanism of this valve is simplicity itself, consisting of a single cam, held in place by a spring, which operates the two valves, one for hot and one for cold water, both closing with pressure.

The bath and basin fixtures, as well as the barbers' shampoo fixture, are made on the same principle as

The Soderlund basin fixture.

The Soderlund bath tub fixture.

the shower-bath valve, and they have gained favor because they are operated with one handle instead of two. The Stebbins Company is of the opinion that these Soderlund specialties represent the highest grade of perfection in each of their respective lines, and the company considers itself fortunate in securing the patent and sole rights to manufacture them. They will be made in connection with the company's extensive line of plumbers' brass goods, and parties interested in these specialties are requested to write for full particulars, mentioning "Domestic Engineering."

The Acme Self-Raising Closet Seat.

Acme selfraising Closet seat.

Wm. S. Emery, of 74-78 Cliff street, New York City, is the manufacturer of the Acme self-raising closet seat, shown in the accompanying illustration. This seat is neat, compact, strong and ornamental, and it has an automatic stop that prevents it from swinging back too far and hitting flush pipe or front of low down tank. Water closets can be roughed-in closer to wall than with any other seat, the manufacturer claims, and it does away with unsightly iron balls and all other adjustments, thus preventing the breaking of the closet and the denting of the wall by weights or balls. This seat is peculiarly well adapted for public buildings, as it can be used as an urinal without the usual raising of seat. It fits any closet made for a seat of the post-hinge type. The manufacturer will gladly send interested parties complete information about this new fixture upon application mentioning "Domestic Engineering."

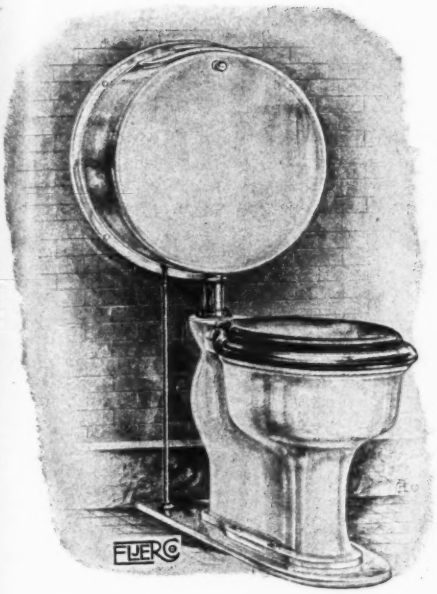
Stanley G. Flagg & Company, of Philadelphia, Pa., manufacturers of pipe fittings, malleable and small steel castings, have discontinued their representation at 257 Broadway, New York City, on a commission basis, and they are now operating a New York office at the same address as a part of their own sales department, in charge of **R. G. Williams.**

The Humphryes Mfg. Co. of Mansfield, O., announces that requests for enameled parts or pieces have been received from so many manufacturers that the company has decided to do work of this kind and is now prepared to enamel on order, either by wet or dry process, special work in iron or steel. Orders are solicited from manufacturers and builders of machinery who find it desirable and often necessary to finish their products or parts of it with a fine clear-white sanitary enameled finish.

A new method for grinding glass has been discovered by the Onward Manufacturing Company, who have factories at Menasha, Wis., and Berlin, Ont. This discovery is a grindstone made from one-half best Portland cement and one-half Silica sand. It must be thoroughly mixed and tamped even. The advantage of this stone is, when properly made there will be no hard and soft spots, and it will grind glass without scratching. The cost is about 10 per cent of the common grindstone. It has been used successfully for one year.

The Preacher—We should arise by our own efforts.

The Kid—Sure, de alarm clock might go wrong.—Cleveland Leader.



PATENTS NOW PENDING
Both mechanical and design

ELJER CHINA TANKS

Same material as bowl with no metal linings to corrode or leak. No wood to open up at joint or become saturated with foul dampness. Extra heavy fittings throughout. If you give this Closet a trial your troubles in this line will end at once.

MANUFACTURED BY

FLJERC

CAMERON, WEST VIRGINIA

Patents

907,117. Balanced Slide-Valve. Frank Barngrover, Packwood, and Edward A. Eustice, Newton, Iowa.

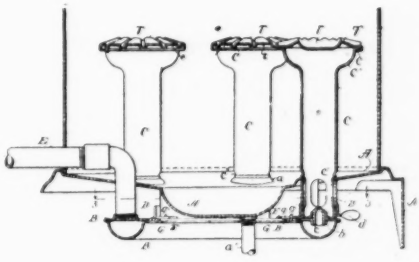
907,159. Cap for Sewer and Other Pipes. George O. Miller, North Tonawanda, N. Y., assignor to Louis A. Kelsey, North Tonawanda, N. Y.

907,163. Machine for Boring, Tapping, etc. William Murchey, Detroit, Mich.

907,210. Pipe-Bender. John R. Williams, Milwaukee, Wis.

907,211. Waste Overflow and Trap. John R. Williams, Milwaukee, Wis.

907,240. Gas-Burner for Water-Heaters. Herbert S. Humphrey, Kalamazoo, Mich., assignor to Humphrey Company, Kalamazoo, Mich. Thirty-four claims are made for this invention, the first one being as follows: "The combination of a base plate formed of sheet metal, having openings therethrough with upwardly projecting flanges about the same, and having a depressed portion or well at the center; a drip pipe for said well; a ring-like gas delivery pipe formed of sheet metal, having threaded openings therein; threaded delivery nozzles adapted to be secured in said openings in the gas delivery pipe; burner tubes formed of sheet metal, having their upper ends flared outwardly, with outwardly projecting flanges at the top, secured to said nozzles, said burner tubes having reduced portions at their lower ends to form shoulders, arranged through said openings in said base plate; notches in the flanges of said burner tubes; burner tips formed of sheet metal, having depressed central portions and radial corrugations or flutes in their outer portions adapted to co-act with the flanges of said burner tubes to form jet orifices; lugs on said tips



adapted to engage said notches clamped over said flanges for retaining said tips in position; air ports in said burner tubes; ring-like valves, having openings therein adapted to be brought into registry with said air ports, sleeved upon said burner tubes; a ring slidably connected to said gas delivery pipe; inwardly projecting arms on said valves having longitudinal slots therein; and pins carried by said ring adapted to engage the slots in said arms, all co-acting for the purpose specified."

907,261. Sink, Basin or the Like. Anna D. Martin, Lancaster, Ohio.

907,384. **Closet-Tank.** Leo Lindenberg, Columbus, Ohio.

907,393. **Expansion Bolt-Anchor.** Henry B. Newhall, Plainfield, N. J.

907,409. **Water Closet.** Horace S. Rumsey, St. Louis, Mo.

907,458. **Faucet.** Patrick F. Cavanaugh, La Crosse, Wis.

907,479. **Locking Device for Cocks with Exchangeable Lock.** Max Ebert, Berlin, Germany.

907,544. **Hot-Water Heating System.** Wallace M. Walcutt, Columbus, Ohio.

907,545. **Pressure-Regulator for Water-Heating Systems.** Wallace M. Walcutt, Columbus, Ohio.

907,590. **Water-Heater.** Anna L. Gibson, Philadelphia, Pa.

Burlington, Iowa.—The Russell Sewage Disposal Company, of this city, has finished the installation of its sewerless sewage disposal system at W. T. Boyer's handsome residence in Farmington, Iowa.—Adv.

BUYERS' READY REFERENCE

Brass Castings.

We are equipped to do your casting in brass, bronze or special metals. Get our prices. McCambridge & Company, Philadelphia, Pa.

Water Closets.

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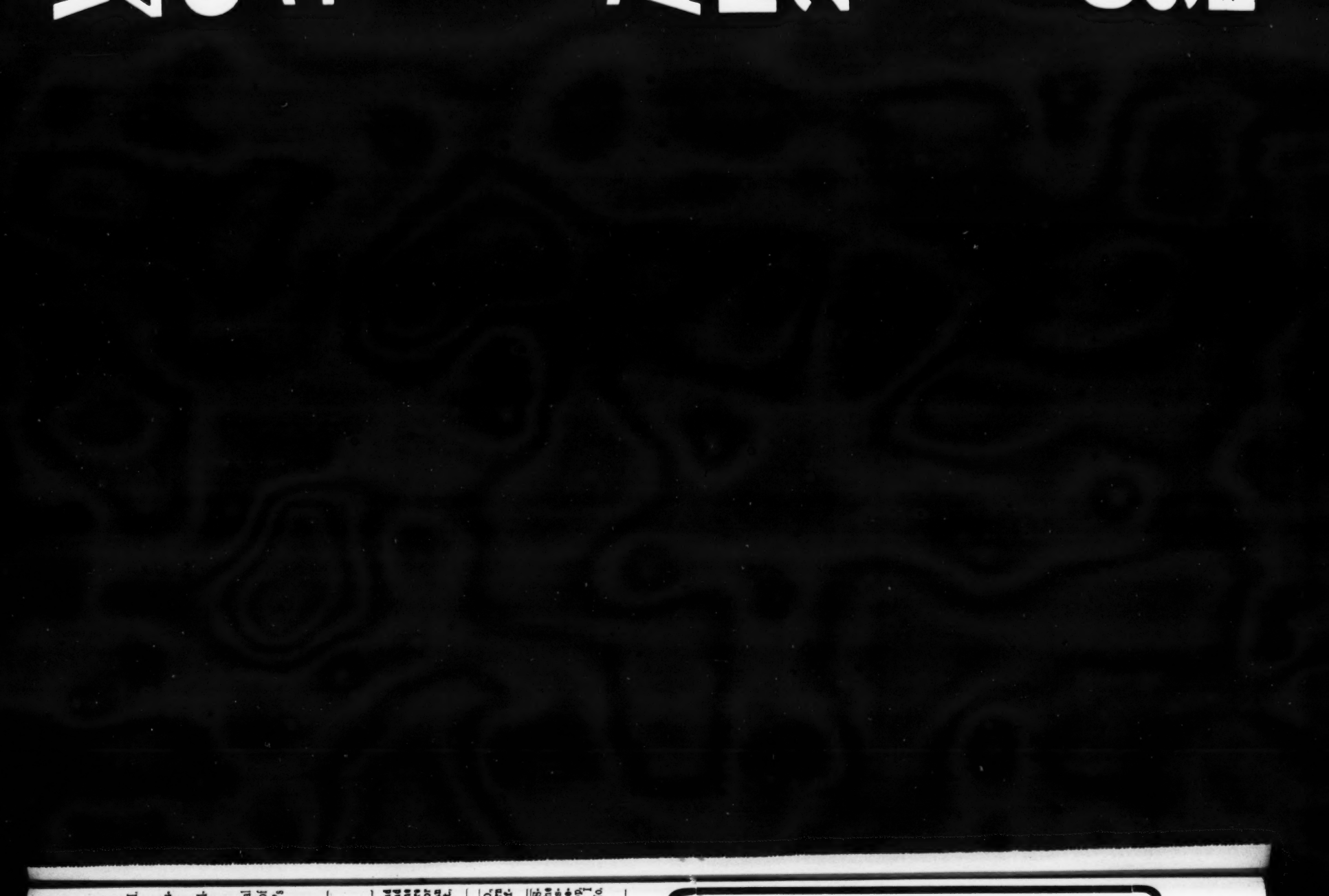
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